WOVOdat 1.1

User Manual

By:

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2014

Introduction

WOVOdat is the World Organization of Volcano Observatories' (WOVO) Database of Volcanic Unrest; instrumentally and visually recorded changes in seismicity, ground deformation, gas emission, and other parameters from their normal baselines. The database is created per the structure and format as described in the WOVOdat 1.0 report of Venezky and Newhall (USGS Openfile report 2007-1117), updated in this WOVOdat 1.1 User Manual.

Volcanoes are frequently restless but only a fraction of unrest leads to eruptions. Uncertainties in interpretation of volcanic unrest are unacceptably high. WOVOdat will capture historical volcanic unrest and make it freely web-accessible, for reference during volcanic crises and for basic research on preeruption processes.

- WOVOdat will be to volcanology as epidemiological databases are to medicine — valuable tools for research and crisis response -

We are importing historical, parametric data from the current myriad of data formats, database architectures, servers and storage media, into a single, comprehensive relational database with standardized formats.

Our website (www.wovodat.org) supports interaction between WOVOdat developers, observatories, and other partners in building the database, e.g. accessing schematic design information and documentation, and utilities for submitting data. The on-line documentation helps users from volcano observatories to understand the structure and data formats of WOVOdat.

Why using MySQL?

WOVOdat choose a relational database for storing and accessing the large amounts of data of volcanic unrest. A relational database is a collection of tables that are related by common fields.

MySQL is an Open Source database, using Structured Query Language (SQL) which capable on handling relational database and also able to integrate with common web languages.

For further information about relational database terminology and concepts, we suggest users to consult online references about relational database concept.

What is WOVOML?

Data inside WOVOdat are stored in a MySQL database, where data tables organized and formatted following the WOVOdat 1.0/1.1 structure (Venezky and Newhall, 2007).

There are several ways to input data into WOVOdat database:

- Manual input under MySQL server (not practical when we have many data to feed in)
- Generate an XML format file which is compatible with WOVOdat SQL structure. *WOVOML* was therefore created as *WOVOdat standard reference XML format file, to facilitate data inputting/importing into the database*.

Detail information/documentation about WOVOdat data handling and formatting can be found at www.wovodat.org/doc/

Various scripts/tools to convert different data format into WOVOML will be made available online, so that the user able to import their data into WOVOdat database interactively.

Use of WOVOdat

WOVOdat will enable searches and comparisons of processed monitoring data, e.g., earthquake hypocenters, geodetic displacements, and gas fluxes from different episodes of unrest from a single volcano, or from unrest of different but analogous volcanoes.

Reference to analogues is especially needed during crises at volcanoes with no historical record or insufficient monitoring data of their own.

If unrest with character X,Y,Z is observed, the user can find other occurrences of similar unrest, and details of any resulting eruptions. Or, one might look for systematic of unrest at analogous volcanoes, selected on the basis of geologic or petrologic similarities.

When the database is sufficiently complete, tools will be made available for users to perform searches and comparisons interactively through our website. Tools for pattern recognition, eruption probability estimation, and other purposes are also planned.

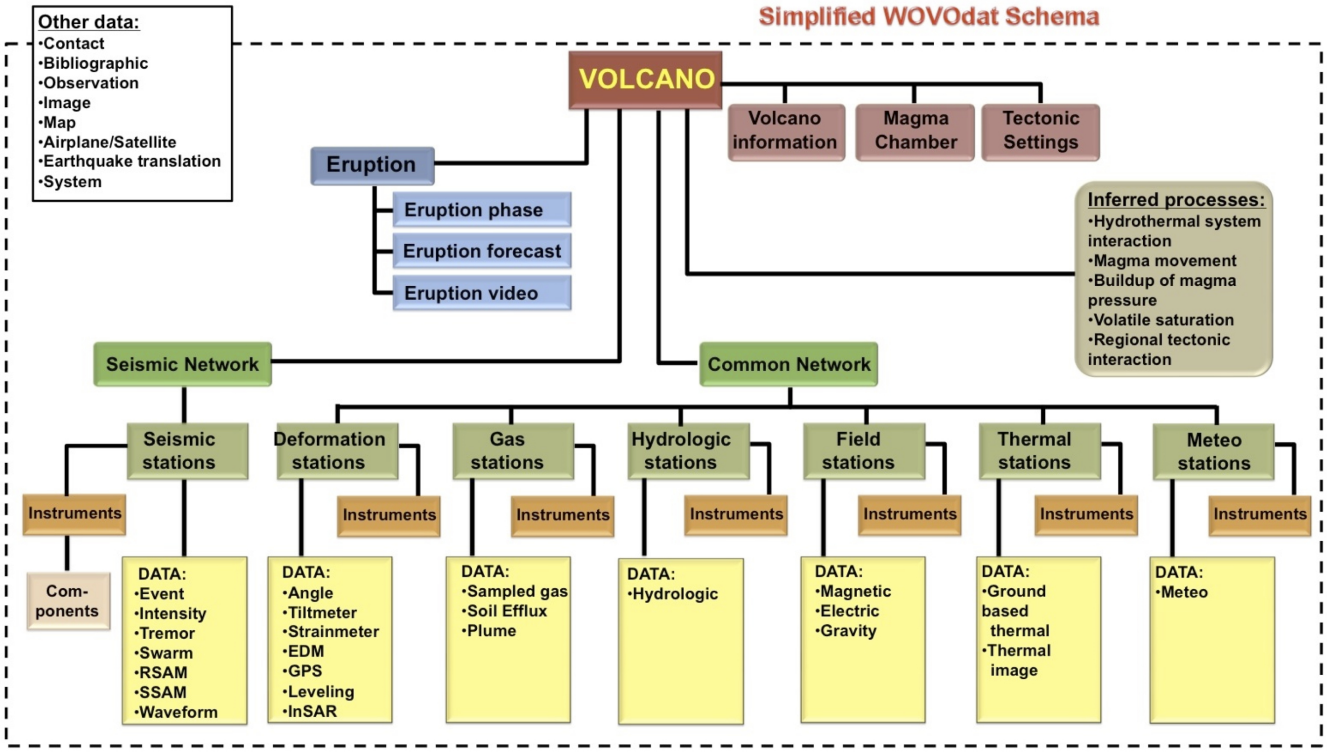

Figure 1. *Type of data stored in the WOVOdat database*

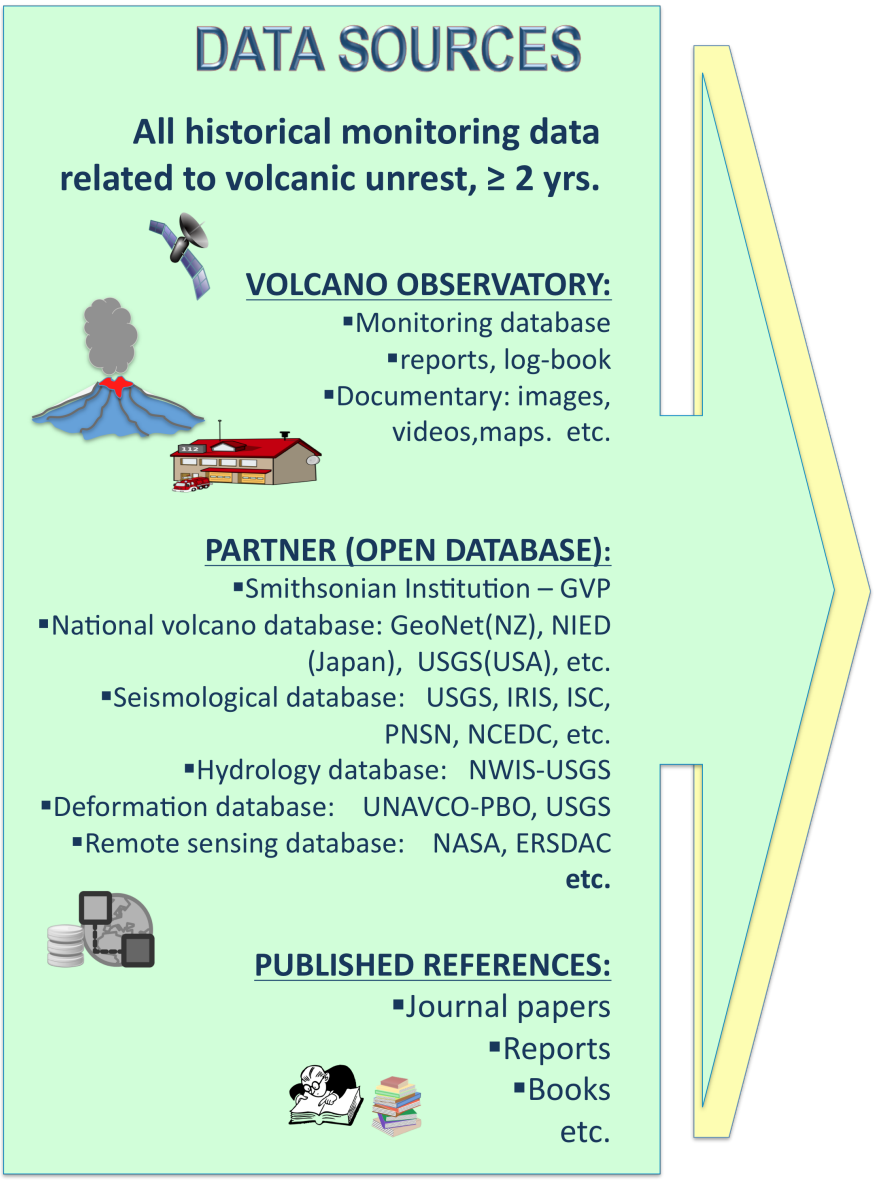

Figure 2. *Type of data sources*

WOVOdat Data Flow

Submitting Data

WOVOdat system uses xml format for its input data file. Any other data format would be converted into xml prior uploaded into the database. Once the original format is recognized, a build in script will be able to convert data into XML format to be then uploaded into MySQL database.

As anticipation of various data formats coming from different observatories, we provide interactive tools for users to submit data in any of three different ways. The data will be converted into WOVOdat XML common formats (WOVOml), uploaded and stored in the database system.

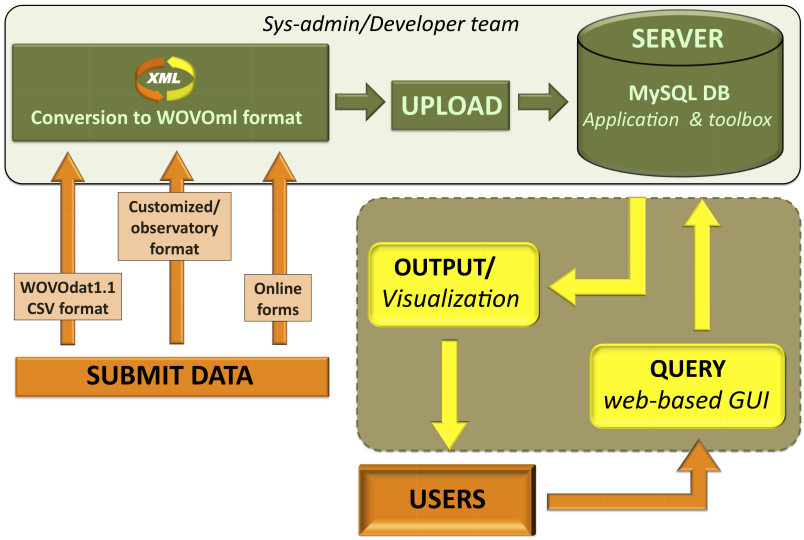

Figure 3. *WOVOdat data flow*

Currently we offer 3 options for users to contribute data:

(a) free format or original observatory format,
(b) WOVOdat CSV standard format, and
(c) Customary/known CSV format.

Data can also be contributed using an online form and uploaded into SQL database following WOVOdat XML standard format.

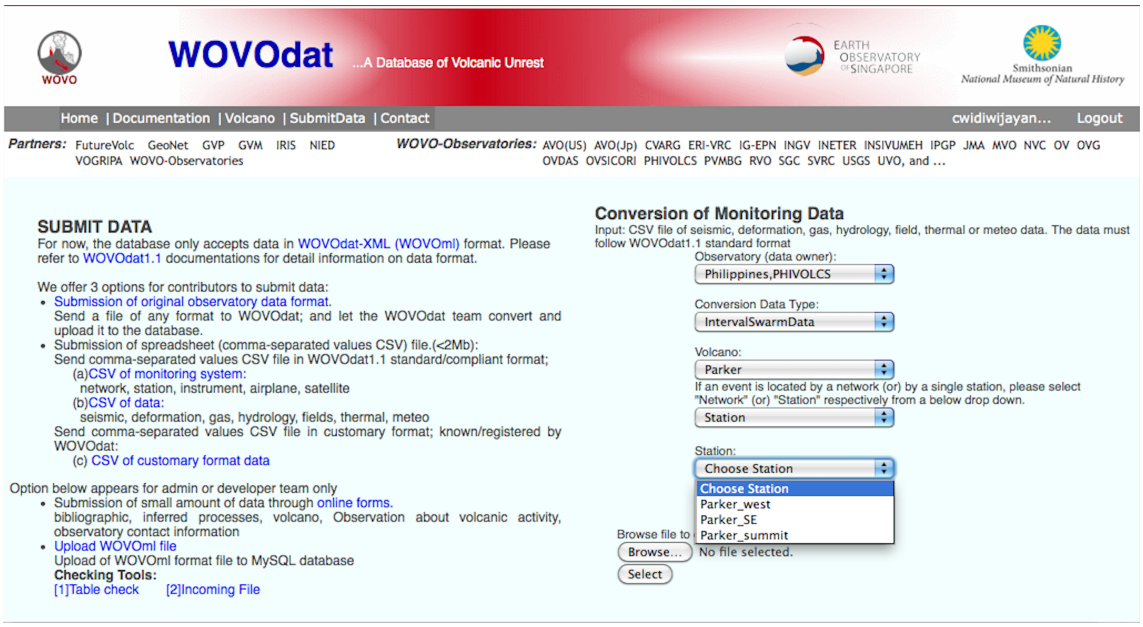

Figure 4. *Interactive online GUI for data submission*

The main users for WOVOdat will be observatory and other scientists seeking comparisons and analogues for their own volcanic unrest, or looking for systematics in pre-eruption behavior. We anticipate significant student use as well.

We are now in the phase of data population. The objective is to include all recorded historical unrest, including but not limited to that which led to eruption. From all reliable sources, including volcano observatories, published materials, and open and partner databases, data are stored in the WOVOdat system. ***Ownership of the data remains with the data contributors.***

Output and visualization tools

Various visualization tools will help users to query and view the data. Registered users will be able to interactively query the database and view volcano monitoring dataset.

Visualization tools in WOVOdat presently enable comparisons of processed monitoring data, e.g., earthquake hypocenters, displacements, and gas flux time series from different episodes of unrest from a single volcano, or from unrest of 2 different but analogous volcanoes. Nearly all data in WOVOdat are time-stamped and georeferenced, so that they can be studied in both space and time.
The data set is still in an early stage of population, but contains enough data to show users its potential.

WOVOdat invites those who wish to contribute visualization and other utilities to do so. Some of these may have already been developed for other personal or observatory uses.

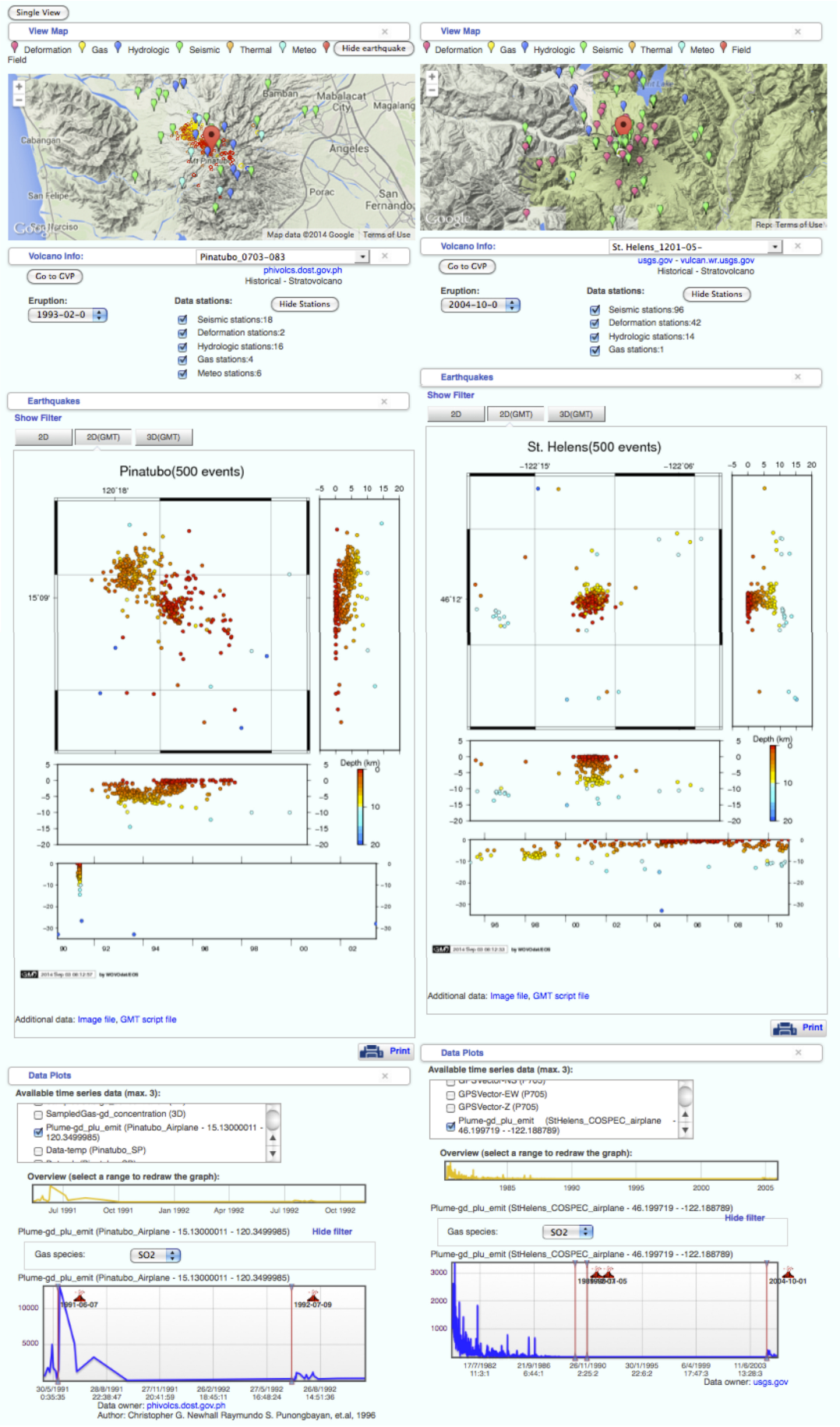

Figure 5. *Example of visualization tools: Data comparison between Pinatubo and St. Helens eruptions.*

WOVOdat table structure and format

Overview on WOVOdat, original schema, table structures are described in WOVOdat version 1.0 (Venezky and Newhall, 2007). The current version is WOVOdat1.1. The overall structure was retained from v1.0 to v1.1; most changes are in the details of parameters.

Reference: Venezky, D. Y., and Newhall, C. G., 2007, WOVOdat design document; the schema, table descriptions, and create table statements for the database of worldwide volcanic unrest (WOVOdat version 1.0): U.S. Geological Survey Open File Report 2007-1117, 184 p. [http://pubs.usgs.gov/of/2007/1117]

Here is the list of tables used in the database, sorted by field:

Volcano

- Volcano - vd
- Volcano information - vd_inf
- Magma chamber - vd_mag
- Tectonic setting - vd_tec

Eruption

- Eruption - ed
- Eruption video - ed_vid
- Eruption phase - ed_phs
- Eruption forecast - ed_for

Seismic

- **Monitoring system**
  - Seismic network - sn
  - Seismic station - ss
  - Seismic instrument - si
  - Seismic component - si_cmp
- **Data**
  - Event recorded by a network - sd_evn
  - Event recorded by a single station - sd_evs
  - Tremor - sd_trm
  - Intensity - sd_int
  - Interval - sd_ivl
  - Waveform - sd_wav
  - RSAM-SSAM - sd_sam
  - RSAM data - sd_rsm
  - SSAM data - sd_ssm

Deformation

- **Monitoring system**
  - Common network - cn
  - Deformation station - ds
  - Deformation instrument (general) - di_gen
  - Tiltmeter/Strainmeter - di_tlt
- **Data**
  - Angle - dd_ang
  - EDM - dd_edm
  - GPS - dd_gps
  - GPS vector - dd_gpv
  - Leveling - dd_lev
  - Strain - dd_str
  - Electronic tilt - dd_tlt
  - Tilt vector - dd_tlv
  - InSAR image - dd_sar
  - InSAR pixel - dd_srd

Fields

- **Monitoring system**
  - Common network - cn
  - Fields station - fs
  - Fields instrument - fi
- **Data**
  - Electric fields - fd_ele
  - Gravity - fd_gra
  - Magnetic fields - fd_mag
  - Magnetic vector - fd_mgv

Gas

- **Monitoring system**
  - Common network - cn
  - Gas station - gs
  - Gas instrument - gi
- **Data**
  - Directly sampled gas - gd
  - Plume - gd_plu
  - Soil efflux - gd_sol

Hydrologic

- **Monitoring system**
  - Common network - cn
  - Hydrologic station - hs
  - Hydrologic instrument - hi
- **Data**
  - Hydrologic data - hd

Thermal

- **Monitoring system**
  - Common network - cn
  - Thermal station - ts
  - Thermal instrument - ti
- **Data**
  - Ground-based thermal data - td
  - Thermal image - td_img
  - Thermal pixel - td_pix

Meteo

- **Monitoring system**
  - Common network - cn
  - Meteo station - ms
  - Meteo instrument - mi
- **Data**
  - Meteo data - med

Inferred processes

- Hydrothermal system interaction - ip_hyd
- Magma movement - ip_mag
- Buildup of magma pressure - ip_pres
- Volatile saturation - ip_sat
- Regional tectonics interaction - ip_tec

Other data

- Contact - cc
- Bibliographic - cb
- Observation - co
- Image - cm
- Map - md

- Airplane/Satellite - cs
- Earthquake terminology translation - st_eqt

System

- **Links**
  - Users to users permissions - jj_concon
  - Image related to data - jj_imgx
  - Contacts for volcanoes - jj_volcon
  - Networks monitoring volcanoes - jj_volnet
  - InSAR images created by satellites - j_sarsat
- **Database administration**
  - Registry - cr
  - Temporary registry - cr_tmp
  - Permission - cp
  - Upload history - cu

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A. VOLCANO

A.1. vd – Volcano

The volcano table is one of the fundamental tables of WOVOdat. In this table ***vd_id*** (the volcano identifier), which links to almost every table, is defined. Main data (Volcano name and CAVW number) for this table will mostly refer to the Smithsonian Global Volcanism Program (SI-GVP) at http://www.volcano.si.edu/world/volcanocriteria.cfm

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comment
1	vd_id	mediumint(8)		UNSIGNED	No	None	AUTO_IN-CREMENT		Volcano identifier (Index)
2	**vd_cavw**	varchar(15)	utf8_uni-code_ci		Yes	NULL			the current CAVW number for this volcano
3	**vd_name**	varchar(255)	utf8_uni-code_ci		Yes	NULL			Volcano name (first)
4	**vd_name2**	varchar(255)	utf8_uni-code_ci		Yes	NULL			Volcano name (second)
5	**vd_tzone**	float			Yes	NULL			time zone (relative to UTC)
6	**vd_mcont**	char(1)	utf8_uni-code_ci		Yes	NULL			multiple contact for this vol-cano
7	**vd_com**	varchar(255)	utf8_uni-code_ci		Yes	NULL			Comments
8	cc_id	smallint(5)		UNSIGNED	Yes	NULL			First Contact ID
9	cc_id2	smallint(5)		UNSIGNED	Yes	NULL			Second Contact ID
10	cc_id3	smallint(5)		UNSIGNED	Yes	NULL			Third Contact ID
11	cc_id4	smallint(5)		UNSIGNED	Yes	NULL			Fourth Contact ID
12	cc_id5	smallint(5)		UNSIGNED	Yes	NULL			Fifth Contact ID
13	**vd_loaddate**	datetime			Yes	NULL			the date the data was entered (in UTC)
14	**vd_pubdate**	datetime			Yes	NULL			the date the data become public
15	cc_id_load	smallint(5)		UNSIGNED	Yes	NULL			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_id	A	No	
CAVW NUMBER	BTREE	Yes	No	vd_cavw	A	Yes	
cc_id	BTREE	No	No	cc_id	A	Yes	

Links

Field	Link to
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id4	cc.cc_id
cc_id5	cc.cc_id
cc_id_load	cc.cc_id

A.2. vd_inf - Volcano information

This table contains information about the volcano that could possibly change over the life of the database, such as the CAVW number, geomorphology, and other descriptive information. Much of the information will be loaded from the Smithsonian Global Volcanism Program *'Volcano reference File (VRF)'.*

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	vd_inf_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano information identifier (Index)
2	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
3	vd_inf_cavw	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*			the current CAVW number for this volcano
4	vd_inf_status	enum('Anthropology', 'Ar/Ar', 'Dendrochronology', etc.)			No	Unknown			Volcano status
5	vd_inf_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Short narrative
6	vd_inf_slat	double			Yes	*NULL*		°	Summit latitude
7	vd_inf_slon	double			Yes	*NULL*		°	Summit longitude
8	vd_inf_selev	float			Yes	*NULL*		m	Summit elevation
9	vd_inf_type	enum('Caldera', 'Cinder cone', 'Complex volcano',etc.)			No	Unknown			Type
10	vd_inf_country	varchar(30)	utf8_unicode_ci		Yes	Null			Country location
11	vd_inf_subreg	varchar(30)	utf8_unicode_ci		Yes	Null			Sub Region (GVP-SI)
12	vd_inf_loc	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Geographic location
13	vd_inf_rtype	enum('Basalt', 'Tephrit/Trachybasalt', 'Andesite/Basaltic-andesite', etc.)			No	Unknown			Dominant rock type
14	vd_inf_evol	float			Yes	*NULL*		m^3	Volume of edifice
15	vd_inf_numcald	tinyint(4)		UNSIGNED	Yes	*NULL*			Number of calderas
16	vd_inf_lcald_dia	float			Yes	*NULL*		km	Diameter of largest caldera
17	vd_inf_ycald_lat	double			Yes	*NULL*		°	Latitude of youngest caldera
18	vd_inf_ycald_lon	double			Yes	*NULL*		°	Longitude of youngest caldera
19	vd_inf_stime	datetime			No	0000-00-00 00:00:00			Start time
20	vd_inf_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
21	vd_inf_etime	datetime			No	9999-12-31 23:59:00			End time
22	vd_inf_etime_unc	datetime			Yes	*NULL*			End time uncertainty
23	vd_inf_com	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
24	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			Contact ID
25	vd_inf_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	vd_inf_pubdate	datetime			Yes	*NULL*			the date the data become public
27	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_inf_id	A	No	
TYPE	BTREE	No	No	vd_inf_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
STATUS	BTREE	No	No	vd_inf_status	A	No	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id

vd_inf_status

⇨ 'Anthropology', 'Ar/Ar', 'Dendrochronology', 'Fumarolic', 'Historical', 'Holocene', 'Holocene?', 'Hot Springs', 'Hydration Rind', 'Hydrophonic', 'Ice Core', 'Lichenometry', 'Magnetism', 'Pleistocene', 'Potassium-Argon', 'Radiocarbon', 'Seismicity', 'Surface Exposure', 'Tephrochronology', 'Thermoluminescence', 'Uncertain', 'Uranium-series', 'Varve Count', 'Unknown'

vd_inf_type

⇨ 'Caldera', 'Cinder cone', 'Complex volcano', 'Compound volcano', 'Cone', 'Crater rows', 'Explosion craters', 'Fissure vent', 'Hydrothermal field', 'Lava cone', 'Lava dome', 'Maar', 'Pumice cone', 'Pyroclastic cone', 'Pyroclastic shield', 'Scoria cone', 'Shield volcano', 'Somma volcano', 'Stratovolcano', 'Subglacial volcano', 'Submarine volcano', 'Tuff cone', 'Tuff ring', 'Unknown', 'Volcanic complex', 'Volcanic field'

vd_inf_rtype

⇨ 'Basalt', 'Tephrit/Trachybasalt', 'Andesite/Basaltic-andesite', 'Trachyandesite', 'Dacite', 'Rhyolite', 'Trachyte', 'Phonolite', 'Phonotephrite', 'Foidite', 'Unknown'

A.3. vd_mag - Magma chamber

This table contains information about the magma chamber such as its composition(s) and minimum size (based on the largest eruption volume). The information will obtain from various sources.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	vd_mag_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano magma chamber identifier (Index)
2	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
3	vd_mag_lvz_dia	float			Yes	*NULL*		km	Diameter of low velocity zone
4	vd_mag_lvz_vol	float			Yes	*NULL*		km^3	Volume of low velocity zone
5	vd_mag_tlvz	float			Yes	*NULL*		km	Depth to top of low velocity zone
6	vd_mag_lerup_vol	double			Yes	*NULL*		km^3	Volume of largest eruption, DRE
7	vd_mag_drock	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Dominant rock type
8	vd_mag_orock	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Outlier rock type
9	vd_mag_orock2	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Second outlier rock type
10	vd_mag_orock3	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Third outlier rock type
11	vd_mag_minsio2	float			Yes	*NULL*			Minimum SiO2 content of whole rocks erupted
12	vd_mag_maxsio2	float			Yes	*NULL*			Maximum SiO2 content of whole rocks erupted
13	vd_mag_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			Owner ID
15	vd_mag_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	vd_mag_pubdate	datetime			Yes	*NULL*			the date the data become public
17	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_mag_id	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

A.4. vd_tec - Tectonic setting

This table contains information about the local tectonic settings, such as rates of movement either along a plate or over a hotspot.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	vd_tec_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tectonic setting identifier (Index)
2	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
3	vd_tec_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
4	vd_tec_strslip	float			Yes	*NULL*		cm/a	Rate of strike-slip
5	vd_tec_ext	float			Yes	*NULL*		cm/a	Rate of extension
6	vd_tec_conv	float			Yes	*NULL*		cm/a	Rate of convergence
7	vd_tec_travhs	float			Yes	*NULL*		cm/a	Travel rate across hotspot
8	vd_tec_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
9	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			Contact ID
10	vd_tec_loaddate	datetime			Yes	*NULL*			the date the data was entered
11	vd_tec_pubdate	datetime			Yes	*NULL*			the date the data become public
12	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
13	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_tec_id	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B. ERUPTION

B.1. ed – Eruption

This table stores general information about an eruption, in general can be classified in different ways based on the style or eruption, composition, duration, and location. The SI-GVP will be a source for most of the data in the eruption table. More additional information on eruption data can be found at http://www.volcano.si.edu/world/eruptioncriteria.cfm.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption identifier (index)
2	ed_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	ed_name	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Eruption name
5	ed_nar	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Narrative
6	ed_stime	datetime			Yes	*NULL*			Eruption start time
7	ed_stime_bc	smallint(6)			Yes	*NULL*			BC year start time
8	ed_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
9	ed_etime	datetime			Yes	*NULL*			Eruption end time
10	ed_etime_bc	smallint(6)			Yes	*NULL*			BC year end time
11	ed_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	ed_climax	datetime			Yes	*NULL*			Onset of climax
13	ed_climax_bc	smallint(6)			Yes	*NULL*			BC year of eruption climax
14	ed_climax_unc	datetime			Yes	*NULL*			Onset of climax uncertainty
15	ed_vei	mediumint(9)			Yes	Null			VEI
16	ed_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
19	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	ed_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	ed_pubdate	datetime			Yes	*NULL*			the date the data become public
22	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_id	A	No	
CODE	BTREE	No	No	ed_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.2. ed_phs - Eruption phase

This table stores specific information about the eruption such as the size of the phase and composition of magma.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_phs_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption phase identifier
2	**ed_phs_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption phase code
3	ed_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption identifier
4	**ed_phs_phsnum**	float			Yes	*NULL*			Phase number
5	**ed_phs_stime**	datetime			Yes	*NULL*			Start time
6	**ed_phs_stime_bc**	smallint(6)			Yes	*NULL*			Year of start time before Christ
7	**ed_phs_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
8	**ed_phs_etime**	datetime			Yes	*NULL*			End time
9	**ed_phs_etime_bc**	smallint(6)			Yes	*NULL*			Year of end time before Christ
10	**ed_phs_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
11	**ed_phs_type**	enum('Ash','Degassing',' Directed explosion','Earthquake(s)','Eruption cloud','Explosion','Fissure formation','Fumarolic or Solfataric','Lava dome formation','Lava flow(s)','Loud audible noises','Phreatic activity','Phreatomagmatic eruption','Pyroclastic flow','Volcanic tremor')	utf8_unicode_ci		No	Null			Eruption Phase Type
12	**ed_phs_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
13	**ed_phs_vei**	mediumint(9)			Yes	*NULL*			VEI (Volcanic Explosivity Index)
14	**ed_phs_max_lext**	float			Yes	*NULL*		m^3/s	Maximum lava extrusion rate
15	**ed_phs_max_expdis**	float			Yes	*NULL*		$kg/s \times 10^6$	Maximum explosive mass discharge rate
16	**ed_phs_dre_tot**	float			Yes	Null			Total DRE volume
17	**ed_phs_dre_lav**	float			Yes	Null			DRE volume of lava
18	**ed_phs_dre_tep**	float			Yes	Null			DRE volume of tephra
19	ed_phs_dre_tot	float			Yes	Null		$m^3 \times 10^6$	Total DRE (Dense-Rock Equivalent) volume
20	ed_phs_dre_lav	float			Yes	Null		$m^3 \times 10^6$	DRE volume of lava
21	ed_phs_dre_tep	float			Yes	Null		$m^3 \times 10^6$	DRE volume of tephra
22	**ed_phs_mix**	enum('Y', 'N', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Evidence of magma mixing: Y=Yes, N=No, U=Unknown
23	**ed_phs_col**	float			Yes	*NULL*		km	Column height
24	**ed_phs_coldet**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Column height determination
25	**ed_phs_minsio2_**	float			Yes	*NULL*		%	Minimum SiO_2 of mat-

	mg								rix glass
26	**ed_phs_maxsio2_mg**	float			Yes	*NULL*		%	Maximum SiO_2 of matrix glass
27	**ed_phs_minsio2_wr**	float			Yes	*NULL*		%	Minimum SiO_2 of whole rock
28	**ed_phs_maxsio2_wr**	float			Yes	*NULL*		%	Maximum SiO_2 of whole rock
29	**ed_phs_totxtl**	float			Yes	*NULL*		%	Total crystallinity
30	**ed_phs_phenc**	float			Yes	*NULL*		%	Phenocryst content
31	**ed_phs_phena**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Phenocryst assemblage
32	**ed_phs_h2o**	float			Yes	*NULL*			Pre-eruption water content
33	**ed_phs_h2o_xtl**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of phenocryst and melt inclusion
34	**ed_phs_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
35	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
36	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
37	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
38	**ed_phs_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
39	**ed_phs_pubdate**	datetime			Yes	*NULL*			the date the data become public
40	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
41	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_phs_id	A	No	
CODE	BTREE	No	No	ed_phs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
ERUPTION	BTREE	No	No	ed_id	A	Yes	

Links

Field	Link to
ed_id	ed.ed_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.3. ed_vid - Eruption video

This table stores information about a video clip of the eruption.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ed_vid_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCRE-		Eruption video identifier

							MENT		
2	**ed_vid_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption video code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			volcano identifier
4	**ed_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption identifier
5	**ed_phs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption phase identifier
6	**ed_vid_link**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to the file or info where to find the clip
7	**ed_vid_stime**	datetime			Yes	*NULL*			Start time
8	**ed_vid_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
9	**ed_vid_length**	time			Yes	*NULL*			Length of the clip
10	**ed_vid_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
11	**ed_vid_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
12	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
13	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
14	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
15	**ed_vid_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	**ed_vid_pubdate**	datetime			Yes	*NULL*			the date the data become public
17	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_vid_id	A	No	
CODE	BTREE	No	No	ed_vid_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
ERUPTION	BTREE	No	No	ed_id	A	Yes	
ERUPTION PHASE	BTREE	No	No	ed_phs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
ed_id	ed.ed_id
ed_phs_id	ed_phs.ed_phs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.4. ed_for - Eruption forecast

This table stores information about forecasts made for a phase of the eruption, such as an overview of the forecast and the times forecasted.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ed_for_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption forecast identifier

2	**ed_for_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption forecast code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**ed_phs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption phase identifier
5	**ed_for_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
6	**ed_for_open**	datetime			Yes	*NULL*			Earliest expected start time of eruption
7	**ed_for_open_unc**	datetime			Yes	*NULL*			Earliest expected start time of eruption uncertainty
8	**ed_for_close**	datetime			Yes	*NULL*			Latest expected start time of eruption
9	**ed_for_close_unc**	datetime			Yes	*NULL*			Latest expected start time of eruption uncertainty
10	**ed_for_time**	datetime			Yes	*NULL*			Issue date
11	**ed_for_time_unc**	datetime			Yes	*NULL*			Issue date uncertainty
12	**ed_for_tsucc**	enum('Y', 'N', 'P')	*utf8_unicode_ci*		Yes	*NULL*			Success on time: Y=Yes, N=No, P=Partly
13	**ed_for_msucc**	enum('Y', 'N', 'P')	*utf8_unicode_ci*		Yes	*NULL*			Success on magnitude: Y=Yes, N=No, P=Partly
14	**ed_for_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
17	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	**ed_for_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	**ed_for_pubdate**	datetime			Yes	*NULL*			the date the data become public
20	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_for_id	A	No	
CODE	BTREE	No	No	ed_for_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
ERUPTION PHASE	BTREE	No	No	ed_phs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
ed_phs_id	ed_phs.ed_phs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C. SEISMIC MONITORING SYSTEM

C.1. sn - Seismic network

This table contains information about the seismic network such as the velocity model used for computing the event locations and a general overview of the types of instruments used.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sn_id	smallint(5)		UNSIGNED	No	None	AUTO_INCREMENT		Seismic network identifier
2	sn_code	varchar(30)	utf8_unicode_ci		Yes	NULL			Seismic Network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	NULL			Volcano identifier
4	sn_name	varchar(30)	utf8_unicode_ci		Yes	NULL			Seismic Network name
5	sn_vmodel	varchar(511)	utf8_unicode_ci		Yes	NULL			Description of velocity model
6	sn_vmodel_detail	varchar(255)	utf8_unicode_ci		Yes	NULL			Link to a file containing additional details about velocity model
7	sn_zerokm	varchar(255)	utf8_unicode_ci		Yes	NULL		m	Elevation of zero km "depth"
8	sn_fdepth_flag	enum('Y', 'N', 'U')	utf8_unicode_ci		Yes	NULL			Depth is fixed: Y=Yes, N=No, U=Unknown
9	sn_fdepth	varchar(255)	utf8_unicode_ci		Yes	NULL			Fixed depth description
10	sn_stime	datetime			No	0000-00-00 00:00:00			Start date
11	sn_stime_unc	datetime			Yes	NULL			Start date uncertainty
12	sn_etime	datetime			No	9999-12-31 23:59:00			End date
13	sn_etime_unc	datetime			Yes	NULL			End date uncertainty
14	sn_tot	tinyint(3)		UNSIGNED	Yes	NULL			Total number of seismometers
15	sn_bb	tinyint(3)		UNSIGNED	Yes	NULL			Number of broadband seismometers
16	sn_smp	tinyint(3)		UNSIGNED	Yes	NULL			Number of short- and mid-period seismometers
17	sn_digital	tinyint(3)		UNSIGNED	Yes	NULL			Number of digital seismometers
18	sn_analog	tinyint(3)		UNSIGNED	Yes	NULL			Number of analog seismometers
19	sn_tcomp	tinyint(3)		UNSIGNED	Yes	NULL			Number of 3 component seismometers
20	sn_micro	tinyint(3)		UNSIGNED	Yes	NULL			Number of microphones
21	sn_desc	varchar(255)	utf8_unicode_ci		Yes	NULL			Description
22	sn_utc	float			Yes	NULL			Difference from UTC
23	sn_ori	enum('D', 'O')	utf8_unicode_ci		Yes	NULL			A flag for source of data. **D**=digitized, **O**= original from observatory
24	sn_com	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
25	cc_id	smallint(5)		UNSIGNED	Yes	NULL			First owner ID
26	cc_id2	smallint(5)		UNSIGNED	Yes	NULL			Second owner ID
27	cc_id3	smallint(5)		UNSIGNED	Yes	NULL			Third owner ID
28	sn_loaddate	datetime			Yes	NULL			the date the data was entered (in UTC)
29	sn_pubdate	datetime			Yes	NULL			the date the data become public
30	cc_id_load	smallint(5)		UNSIGNED	Yes	NULL			contact ID for the person who entered the data
31	cb_ids	varchar(255)	utf8_unicode_ci		Yes	NULL			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sn_id	A	No	
CODE	BTREE	No	No	sn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.2. ss - Seismic station

This table stores information such as a location, name, system gain, and comments about the seismic stations where the data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ss_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCRE-MENT		Seismic station identifier
2	**ss_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic station code
3	**sn_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Seismic network identifier
4	**ss_name**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic station name
5	**ss_lat**	double			Yes	*NULL*		°	Station Latitude
6	**ss_lon**	double			Yes	*NULL*		°	Station longitude
7	**ss_elev**	float			Yes	*NULL*		m	Station elevation
8	**ss_depth**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		m	Depth of instruments
9	**ss_stime**	datetime			No	0000-00-00 00:00:00			Start date
10	**ss_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
11	**ss_etime**	datetime			No	9999-12-31 23:59:00			End date
12	**ss_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
13	**ss_utc**	float			Yes	*NULL*			Difference from UTC
14	**ss_instr_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Instrument types
15	**ss_sgain**	float			Yes	*NULL*			System gain
16	**ss_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	**ss_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
18	**ss_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	**ss_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	**ss_pubdate**	datetime			Yes	*NULL*			the date the data become public
24	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ss_id	A	No	
CODE	BTREE	No	No	ss_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.3. si - Seismic instrument

This table stores information such as the instrument name, model, number of components and response time.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**si_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic instrument identifier
2	**si_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic instrument code
3	**ss_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			seismic station identifier
4	**si_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the seismic instrument (recorder)
5	**si_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Instrument type
6	**si_range**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Dynamic range of seismic instrument
7	**si_igain**	float			Yes	*NULL*			the instrument gain
8	**si_filter**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Filters, if applied
9	**si_ncomp**	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of components
10	**si_resp**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Response overview
11	**si_resp_file**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			link to file containing response
12	**si_stime**	datetime			No	0000-00-00 00:00:00			Start date
13	**si_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
14	**si_etime**	datetime			No	9999-12-31 23:59:00			End date
15	**si_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
16	**si_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
17	**si_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	**si_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	**si_pubdate**	datetime			Yes	*NULL*			the date the data become public
23	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	si_id	A	No	
CODE	BTREE	No	No	si_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.4. si_cmp - Seismic component

This table stores information about an individual component (geophone) that sends data to the instrument or recorder such as the component name, model, orientation, band type, and sampling rate.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	si_cmp_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic component identifier
2	**si_cmp_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic component code
3	si_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic instrument identifier
4	**si_cmp_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the geophone
5	**si_cmp_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Seismic component type
6	**si_cmp_resp**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of response
7	**si_cmp_band**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Band type (SEED convention)
8	**si_cmp_samp**	float			Yes	*NULL*		Hz	Sampling rate
9	**si_cmp_icode**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Instrument code (SEED convention)
10	**si_cmp_orient**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Orientation code (SEED convention)
11	**si_cmp_sens**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Sensitivity
12	**si_cmp_depth**	float			Yes	*NULL*		m	Depth
13	**si_cmp_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
14	**si_cmp_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	**si_cmp_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)

19	**si_cmp_pubdate**	datetime			Yes	*NULL*			the date the data become public
20	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	si_cmp_id	A	No	
CODE	BTREE	No	No	si_cmp_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
INSTRUMENT	BTREE	No	No	si_id	A	Yes	

Links

Field	Link to
si_id	si.si_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D. SEISMIC DATA

D.1. sd_evn - Seismic event data from a network

This table contains seismic data that were collected from several stations in a network and then processed to give a location.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**sd_evn_id**	mediumint(8)		UNSIGNED	No	None	AUTO_INCREMENT		Seismic event identifier
2	**sd_evn_code**	varchar(30)	utf8_unicode_ci		Yes	NULL			Seismic event code
3	**sn_id**	smallint(5)		UNSIGNED	Yes	NULL			Seismic network identifier
4	**sd_evn_arch**	varchar(255)	utf8_unicode_ci		Yes	NULL			Location of the seismogram archive
5	**sd_evn_time**	datetime			Yes	NULL			Origin time
6	**sd_evn_timecsec**	decimal(2,2)			Yes	NULL			Centisecond precision for origin time
7	**sd_evn_time_unc**	datetime			Yes	NULL			Origin time uncertainty
8	**sd_evn_timecsec_unc**	decimal(2,2)			Yes	NULL			Centisecond precision for origin time uncertainty
9	**sd_evn_dur**	float			Yes	NULL		s	Average duration of the earthquake as recorded at stations <15 km from the volcano
10	**sd_evn_dur_unc**	float			Yes	NULL		s	Uncertainty in average duration of the earthquake
11	**sd_evn_tech**	varchar(255)	utf8_unicode_ci		Yes	NULL			The technique used to locate the event

12	**sd_evn_picks**	enum('A', 'R', 'H', 'U')	utf8_unicode_ci		Yes	NULL			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
13	**sd_evn_elat**	double			Yes	NULL		°	Estimated latitude
14	**sd_evn_elon**	double			Yes	NULL		°	Estimated longitude
15	**sd_evn_edep**	float			Yes	NULL		km	Estimated depth
16	**sd_evn_fixdep**	enum('Y', 'N', 'U')	utf8_unicode_ci		Yes	NULL			Fixed depth: Y=Yes, N=No, U=Unknown
17	**sd_evn_nst**	tinyint(3)		UNSIGNED	Yes	NULL			The total number of seismic stations that reported arrival times for this earthquake
18	**sd_evn_nph**	tinyint(3)		UNSIGNED	Yes	NULL			The total number of P and S arrival-time observations used to compute the hypocenter location
19	**sd_evn_gp**	float			Yes	NULL		°	The largest azimuthal gap between azimuthally adjacent stations
20	**sd_evn_dcs**	float			Yes	NULL		km	Horizontal distance from the epicenter to the nearest station
21	**sd_evn_rms**	float			Yes	NULL		s	RMS travel time residual
22	**sd_evn_herr**	float			Yes	NULL		km	The horizontal location error defined as the length of the largest projection of the three principal errors on a horizontal plane
23	**sd_evn_xerr**	float			Yes	NULL		km	The maximum x (longitude) error for cases where the horizontal error is not given
24	**sd_evn_yerr**	float			Yes	NULL		km	The maximum y (latitude) error for cases where the horizontal error is not given
25	**sd_evn_derr**	float			Yes	NULL		km	The depth error defined as the largest projection of the three principal errors on a vertical line
26	**sd_evn_locqual**	varchar(255)	utf8_unicode_ci		Yes	NULL			The quality of the calculated location
27	**sd_evn_pmag**	float			Yes	NULL			The primary magnitude
28	**sd_evn_pmag_type**	varchar(30)	utf8_unicode_ci		Yes	NULL			The primary magnitude type, e.g., Ms, Mb, Mw, Md (see Appendix 4 for more info)
29	**sd_evn_smag**	float			Yes	NULL			A secondary magnitude
30	**sd_evn_smag_type**	varchar(30)	utf8_unicode_ci		Yes	NULL			Secondary magnitude type
31	**sd_evn_eqtype**	enum('R', 'Q', 'V', 'VT', 'VT_D', 'VT_S', 'H', 'H_HLF', 'H_LHF', 'LF', 'LF_LP', 'LF_T', 'LF_ILF', 'VLP', 'E', 'U', 'O', 'X','G','PF')			Yes	NULL			WOVOdat classification for the earthquake type (see Appendix 4 for more info)
32	**sd_evn_mtscale**	float			Yes	NULL			The scale of the following moment tensor data. Please store as a multiplier for the moment tensor data
33	**sd_evn_mxx**	float			Yes	NULL			Moment tensor m_xx stored as +/- x.xx
34	**sd_evn_mxy**	float			Yes	NULL			Moment tensor m_xy stored as +/- x.xx
35	**sd_evn_mxz**	float			Yes	NULL			Moment tensor m_xz stored

									as +/- x.xx
36	**sd_evn_myy**	float			Yes	NULL			Moment tensor m_yy
37	**sd_evn_myz**	float			Yes	NULL			Moment tensor m_yz
38	**sd_evn_mzz**	float			Yes	NULL			Moment tensor m_zz
39	**sd_evn_strk1**	float			Yes	NULL		°	Strike 1 of best double couple
40	**sd_evn_strk1_err**	float			Yes	NULL		°	The uncertainty in the value of strike 1
41	**sd_evn_dip1**	float			Yes	NULL		°	Dip 1 of best double couple
42	**sd_evn_dip1_err**	float			Yes	NULL		°	The uncertainty in the value of dip 1
43	**sd_evn_rak1**	float			Yes	NULL		°	Rake 1 of best double couple
44	**sd_evn_rak1_err**	float			Yes	NULL		°	The uncertainty in the value of rake 1
45	**sd_evn_strk2**	float			Yes	NULL		°	Strike 2 of best double couple
46	**sd_evn_strk2_err**	float			Yes	NULL		°	The uncertainty in the value of strike 2
47	**sd_evn_dip2**	float			Yes	NULL		°	Dip 2 of best double couple
48	**sd_evn_dip2_err**	float			Yes	NULL		°	The uncertainty in the value of dip 2
49	**sd_evn_rak2**	float			Yes	NULL		°	Rake 2 of best double couple
50	**sd_evn_rak2_err**	float			Yes	NULL		°	The uncertainty in the value of rake 2
51	**sd_evn_foc**	varchar(255)	utf8_unicode_ci		Yes	NULL			The focal plane solution (beachball, w/ arrivals) stored as a .gif for well defined events
52	**sd_evn_samp**	float			Yes	NULL		Hz	The sampling rate
53	**sd_evn_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
54	**sd_evn_com**	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
55	**cc_id**	smallint(5)		UNSIGNED	Yes	NULL			First owner ID
56	**cc_id2**	smallint(5)		UNSIGNED	Yes	NULL			Second owner ID
57	**cc_id3**	smallint(5)		UNSIGNED	Yes	NULL			Third owner ID
58	**sd_evn_loaddate**	datetime			Yes	NULL			the date the data was entered (in UTC)
59	**sd_evn_pubdate**	datetime			Yes	NULL			the date the data become public
60	**cc_id_load**	smallint(5)		UNSIGNED	Yes	NULL			contact ID for the person who entered the data
61	**cb_ids**	varchar(255)	utf8_unicode_ci		Yes	NULL			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_evn_id	A	No	
CODE	BTREE	No	No	sd_evn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	
TECHNIQUE	BTREE	No	No	sd_evn_tech	A	Yes	
latlonIndex	BTREE	No	No	sd_evn_elat	A	Yes	

				sd_evn_elon	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.2. sd_evs - Seismic event data from a single station

This table contains seismic data that were collected from a single station and therefore no location can be calculated.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_evs_id	mediumint(8)		UN-SIGNED	No	*None*	AUTO_INCRE-MENT		Seismic event identifier
2	**sd_evs_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Seismic event code
3	ss_id	mediumint(8)		UN-SIGNED	Yes	*NULL*			seismic station identifier
4	**sd_evs_time**	datetime			Yes	*NULL*			Start time
5	**sd_evs_time_ms**	decimal(2,2)			Yes	*NULL*			Centisecond precision for start time
6	**sd_evs_time_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**sd_evs_time_unc_ms**	decimal(2,2)			Yes	*NULL*			Centisecond precision for start time uncertainty
8	**sd_evs_picks**	enum('A', 'R', 'H', 'U')	*utf8_uni-code_ci*		Yes	*NULL*			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
9	**sd_evs_spint**	float			Yes	*NULL*		s	S-P interval
10	**sd_evs_dur**	float			Yes	*NULL*		s	Duration
11	**sd_evs_dur_unc**	float			Yes	*NULL*		s	Duration uncertainty
12	**sd_evs_dist_actve n**	float			Yes	*NULL*		km	Distance from active vent
13	**sd_evs_maxamp-trac**	float			Yes	*NULL*			Maximum amplitude of trace
14	**sd_evs_samp**	float			Yes	*NULL*		Hz	Sampling rate
15	**sd_evs_eqtype**	enum('R', 'Q', 'V', 'VT', 'VT_D', 'VT_S', 'H', 'H_HLF', 'H_LHF', 'LF', 'LF_LP', 'LF_T', 'LF_ILF', 'VLP', 'E', 'U', 'O', 'X','G','PF')			Yes	NULL			WOVOdat classification for the earthquake type (see Appendix 4 for more info)
16	**sd_evs_domFre**	float			Yes	*NULL*		Hz	Dominant frequency
17	**sd_evs_firMotion**	enum('Up', 'Down', 'Unknown')	*utf8_unic ode_ci*		Yes	*NULL*			First motion of the earth-quake waveform
18	**sd_evs_mag**	float			Yes	*NULL*			Earthquake magnitude
19	**sd_evs_energy**	float			Yes	*NULL*		erg	Seismic energy
20	**sd_evs_ori**	enum('D', 'O')	*utf8_unic ode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
21	**sd_evs_com**	varchar(255)	utf8_uni-code_ci		Yes	NULL			Comments

22	cc_id	smallint(5)		UN-SIGNED	Yes	*NULL*			First owner ID
23	cc_id2	smallint(5)		UN-SIGNED	Yes	*NULL*			Second owner ID
24	cc_id3	smallint(5)		UN-SIGNED	Yes	*NULL*			Third owner ID
25	**sd_evs_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	**sd_evs_pubdate**	datetime			Yes	*NULL*			the date the data become public
27	cc_id_load	smallint(5)		UN-SIGNED	Yes	*NULL*			contact ID for the person who entered the data
28	cb_ids	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_evs_id	A	No	
CODE	BTREE	No	No	sd_evs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.3. sd_int - Intensity

This table was created to store information about the intensities of events that may or may not have been recorded by a station.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_int_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Sismic intensity identifier
2	**sd_int_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic intensity code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	sd_evn_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic network event identifier
5	sd_evs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Single station event iden-tifier
6	**sd_int_time**	datetime			Yes	*NULL*			Time
7	**sd_int_time_unc**	datetime			Yes	*NULL*			Time uncertainty
8	**sd_int_city**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			City
9	**sd_int_maxdist**	float			Yes	*NULL*		km	Maximum distance felt
10	**sd_int_maxrint**	float			Yes	*NULL*			Maximum reported intens-ity
11	**sd_int_maxrint_dist**	float			Yes	*NULL*		km	Distance at maximum re-ported intensity
12	**sd_int_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory

13	**sd_int_com**	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
14	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
15	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	**sd_int_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	**sd_int_pubdate**	datetime			Yes	*NULL*			the date the data become public
19	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_int_id	A	No	
CODE	BTREE	No	No	sd_int_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
sd_evn_id	sd_evn.sd_evn_id
sd_evs_id	sd_evs.sd_evs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.4. sd_trm - Tremor

This table contains information about tremor such as the time interval, qualitative depth, dominant frequency, amplitude range, and reduced displacement.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**sd_trm_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic tremor identifier
2	**sd_trm_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic tremor code
3	**sn_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Seismic network identifier
4	**ss_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic station identifier
5	**sd_trm_stime**	datetime			Yes	*NULL*			Start time
6	**sd_trm_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**sd_trm_etime**	datetime			Yes	*NULL*			End time
8	**sd_trm_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
9	**sd_trm_dur_day**	float			Yes	*NULL*		min	Duration per day
10	**sd_trm_dur_day_unc**	float			Yes	*NULL*		min	Duration per day uncertainty
11	**sd_trm_type**	enum('G', 'M', 'H', 'C')			Yes	*NULL*			WOVOdat classification for the earthquake type (see

									Appendix 4 for more info)
12	**sd_trm_qdepth**	enum('D', 'I', 'S', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Qualitative depth: D=Deep (>10 km), I=Intermediate (4-10 km), S=Shallow (0-4 km), U =Unknown
13	**sd_trm_domfreq1**	float			Yes	*NULL*		Hz	Dominant frequency
14	**sd_trm_domfreq2**	float			Yes	*NULL*		Hz	Second dominant frequency
15	**sd_trm_maxamp**	float			Yes	*NULL*			Maximum amplitude
16	**sd_trm_noise**	float			Yes	*NULL*			Background noise level
17	**sd_trm_reddis**	float			Yes	*NULL*			Reduced displacement (as estimated using a station >5km from source)
18	**sd_trm_rderr**	float			Yes	*NULL*			Reduced displacement error
19	**sd_trm_visact**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of associated visible activity
20	**sd_trm_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
21	**sd_trm_com**	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
22	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
23	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
24	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
25	**sd_trm_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	**sd_trm_pubdate**	datetime			Yes	*NULL*			the date the data become public
27	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
28	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_trm_id	A	No	
CODE	BTREE	No	No	sd_trm_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.5. sd_ivl - Interval (swarm)

This table contains data about earthquakes that occur in specified time intervals, e.g., as seismic swarms.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_ivl_id	mediumint(8)		UNSIGNED	No	None	AUTO_INCREMENT		Seismic interval identifier
2	sd_ivl_code	varchar(30)	utf8_unicode_ci		Yes	NULL			Seismic interval code
3	sn_id	smallint(5)		UNSIGNED	Yes	NULL			Seismic network identifier
4	ss_id	mediumint(8)		UNSIGNED	Yes	NULL			Seismic station identifier
5	sd_ivl_eqtype	enum('R', 'Q', 'V', 'VT', 'VT_D', 'VT_S', 'H', 'H_HLF', 'H_LHF', 'LF', 'LF_LP', 'LF_T', 'LF_ILF', 'VLP', 'E', 'U', 'O', 'X','G','PF')			Yes	NULL			Earthquake type (see Appendix 4 for more info)
6	sd_ivl_stime	datetime			Yes	NULL			Start time
7	sd_ivl_stime_unc	datetime			Yes	NULL			Start time uncertainty
8	sd_ivl_etime	datetime			Yes	NULL			End time
9	sd_ivl_etime_unc	datetime			Yes	NULL			End time uncertainty
10	sd_ivl_hdist	float			Yes	NULL		km	Horizontal distance from summit to swarm center
11	sd_ivl_avgdepth	float			Yes	NULL		m	Mean depth of the swarm earthquakes
12	sd_ivl_vdispers	float			Yes	NULL		km	Vertical dispersion(range) of depth over which the swarm earthquakes occurred
13	sd_ivl_hmigr_hyp	float			Yes	NULL		km	Horizontal migration of hypocenters from/to the summit (outward=positive; inward=negative)
14	sd_ivl_vmigr_hyp	float			Yes	NULL		km	Vertical migration of hypocenters (up=positive, down=negative)
15	sd_ivl_patt	varchar(30)	utf8_unicode_ci		Yes	NULL			Temporal pattern (defined pattern)
16	sd_ivl_data	enum('L', 'C', 'H', 'U')	utf8_unicode_ci		Yes	NULL			Data type: L=Located earthquakes, C=Detected by computer trigger algorithm, H=Hand counted, U=Unknown
17	sd_ivl_picks	enum('A', 'R', 'H', 'U')	utf8_unicode_ci		Yes	NULL			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
18	sd_ivl_felt_stime	datetime			Yes	NULL			Felt earthquake counts start time
19	sd_ivl_felt_stime_unc	datetime			Yes	NULL			Felt earthquake counts start time uncertainty
20	sd_ivl_felt_etime	datetime			Yes	NULL			Felt earthquake counts end time
21	sd_ivl_felt_etime_unc	datetime			Yes	NULL			felt earthquake counts end time uncertainty
22	sd_ivl_nrec	mediumint(6)		UNSIGNED	Yes	NULL			Number of recorded earthquakes
23	sd_ivl_nfelt	smallint(4)		UNSIGNED	Yes	NULL			Number of felt earthquakes
24	sd_ivl_etot_stime	datetime			Yes	NULL			Total seismic energy release (seismic moment) measurement start time
25	sd_ivl_etot_stime_unc	datetime			Yes	NULL			Total seismic energy release measurement start time uncertainty
26	sd_ivl_etot_etime	datetime			Yes	NULL			Total seismic energy release measurement end time

27	**sd_ivl_etot_etime_unc**	datetime			Yes	*NULL*			Total seismic energy release measurement end time uncertainty
28	**sd_ivl_etot**	float			Yes	*NULL*		$erg^{-0.5}$	Total seismic energy release
29	**sd_ivl_fmin**	float			Yes	NULL		Hz	Minimum frequency of recorded earthquake
30	**sd_ivl_fmax**	float			Yes	NULL		Hz	Maximum frequency of recorded earthquake
31	**sd_ivl_amin**	float			Yes	*NULL*			Minimum amplitude of recorded earthquake
32	**sd_ivl_amax**	float			Yes	*NULL*			Maximum amplitude of recorded earthquake
33	**sd_ivl_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
34	**sd_ivl_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
35	**sd_ivl_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			comments
36	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
37	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
38	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
39	**sd_ivl_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
40	**sd_ivl_pubdate**	datetime			Yes	*NULL*			the date the data become public
41	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
42	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_ivl_id	A	No	
CODE	BTREE	No	No	sd_ivl_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.6. sd_sam - RSAM-SSAM

This table stores information of the Real-time Seismic Amplitude Measurements (RSAM) and Seismic Spectral Amplitude measurements (SSAM); needed to define the boundaries of the RSAM/SSAM images/graph. The time series data needed to create the graph/image are stored in the individual RSAM(sd_rsm) and SSAM(sd_ssm) tables.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_sam_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic RSAM-SSAM identifier
2	sd_sam_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic RSAM-SSAM code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic station identifier
4	sd_sam_stime	datetime			Yes	*NULL*			Start time
5	sd_sam_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
6	sd_sam_etime	datetime			Yes	*NULL*			End time
7	sd_sam_etime_unc	datetime			Yes	*NULL*			End time uncertainty
8	sd_sam_int	float			Yes	*NULL*		s	Counting interval
9	sd_sam_int_unc	float			Yes	*NULL*		s	Counting interval uncertainty
10	sd_sam_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
11	sd_sam_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
12	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
13	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
14	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
15	sd_sam_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	sd_sam_pubdate	datetime			Yes	*NULL*			the date the data become public
17	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_sam_id	A	No	
CODE	BTREE	No	No	sd_sam_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.6.a. sd_rsm - RSAM data

This table stores the RSAM time series data needed to create an RSAM image/graph defined in sd_sam table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_rsm_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		RSAM data identifier

2	sd_sam_id	mediumint(8)		UNSIGNED	Yes	*NULL*			RSAM-SSAM image/graph identifier
3	**sd_rsm_stime**	datetime			Yes	*NULL*			Start time
4	**sd_rsm_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
5	**sd_rsm_count**	float			Yes	*NULL*			RSAM count during this interval
6	**sd_rsm_calib**	float			Yes	*NULL*			Reduced displacement per 100 RSAM counts
7	**sd_rsm_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
8	**sd_rsm_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
9	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_rsm_id	A	No	
TIME	BTREE	Yes	No	sd_sam_id	A	Yes	
				sd_rsm_stime	A	Yes	

Links

Field	Link to
sd_sam_id	sd_sam.sd_sam_id
cc_id_load	cc.cc_id

D.6.b. sd_ssm - SSAM data

This table stores the SSAM time series data needed to create an SSAM image/graph defined in sd_sam table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_ssm_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		SSAM data identifier
2	sd_sam_id	mediumint(8)		UNSIGNED	Yes	*NULL*			RSAM-SSAM image/graph identifier
3	**sd_ssm_stime**	datetime			Yes	*NULL*			Start time
4	**sd_ssm_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
5	**sd_ssm_lowf**	float			Yes	*NULL*		Hz	Low frequency limit
6	**sd_ssm_highf**	float			Yes	*NULL*		Hz	High frequency limit
7	**sd_ssm_count**	float			Yes	*NULL*			SSAM count during this interval
8	**sd_ssm_calib**	float			Yes	*NULL*			Reduced displacement per 100 SSAM counts
9	**sd_ssm_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
10	**sd_ssm_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
11	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_ssm_id	A	No	
TIME AND FREQUENCY	BTREE	Yes	No	sd_sam_id	A	Yes	
				sd_ssm_stime	A	Yes	
				sd_ssm_lowf	A	Yes	

Links

Field	Link to
sd_sam_id	sd_sam.sd_sam_id
cc_id_load	cc.cc_id

D.7. sd_wav - Waveform

This table contains sample of waveforms to highlight common and uncommon events (network event or single-station event or tremor event) at different volcanoes. This waveform table links to the event table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_wav_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Waveform identifier
2	sd_wav_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Waveform code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			seismic station identifier
4	sd_evn_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic event identifier
5	sd_evs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Single event identifier
6	sd_trm_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic tremor identifier
7	sd_wav_arch	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location of seismogram archive (institutional address)
8	sd_wav_link	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to archive (path/link to the image file)
9	sd_wav_dist	enum('P', 'I', 'D', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Distance from summit: P=Proximal (< 2 km), I=Intermediate (2-5 km), D=Distal (> 5 km), U=Unknown
10	sd_wav_img	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Image/file format of the waveform
11	sd_wav_info	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Background information
12	sd_wav_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of the waveform
13	sd_wav_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
14	sd_wav_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	sd_wav_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	sd_wav_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_wav_id	0	A	No	
CODE	BTREE	No	No	sd_wav_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
STATION	BTREE	No	No	ss_id		A	Yes	
EVENT	BTREE	No	No	sd_evn_id		A	Yes	
EVENT TYPE	BTREE	No	No	sd_evs_id		A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
sd_evn_id	sd_evn.sd_evn_id
sd_evs_id	sd_evs.sd_evs_id
sd_trm_id	sd_trm.sd_trm_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E. DEFORMATION MONITORING SYSTEM

E.1. cn - Common network (for Deformation network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Common network identifier
2	**cn_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**cn_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	**cn_type**	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	**cn_area**	float			Yes	*NULL*		km^2	Network area coverage
7	**cn_map**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	**cn_stime**	datetime			No	0000-00-00 00:00:00			Start time
9	**cn_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
10	**cn_etime**	datetime			No	9999-12-31 23:59:59			End time
11	**cn_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
12	**cn_utc**	float			Yes	*NULL*			Difference from UTC
13	**cn_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	**cn_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**cn_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**cn_loaddate**	datetime			No	*None*			the date the data was entered (in UTC)
20	**cn_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.2. ds - Deformation station

This table stores information such as a location, name, and description for stations where deformation or geodetic data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ds_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCRE-MENT		Deformation station identifier
2	**ds_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Deformation station code
3	**ds_name**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Deformation station name
4	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Deformation network identifier
5	**ds_perm**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of permanent instruments
6	**ds_nlat**	double			Yes	*NULL*		°	Station latitude
7	**ds_nlon**	double			Yes	*NULL*		°	Station longitude
8	**ds_nelev**	float			Yes	*NULL*		m	Station elevation
9	**ds_herr_loc**	float			Yes	*NULL*			Horizontal precision of station location
10	**ds_stime**	datetime			No	0000-00-00 00:00:00			Start time
11	**ds_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
12	**ds_etime**	datetime			No	9999-12-31 23:59:59			End time
13	**ds_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
14	**ds_utc**	float			Yes	*NULL*			Difference from UTC
15	**ds_rflag**	enum('Y', 'N')	*utf8_uni-code_ci*		Yes	*NULL*			Reference station: Y=Yes, N=No
16	**ds_desc**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Description
17	**ds_ori**	enum('D', 'O')	*utf8_unico de_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
18	**ds_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	**ds_loaddate**	datetime			Yes	*NULL*			the date the data was entered

									(in UTC)
23	**ds_pubdate**	datetime			Yes	*NULL*			the date the data become public
24	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ds_id	A	No	
CODE	BTREE	No	No	ds_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.3. di_gen - General deformation instrument

This table stores information about each individual instrument.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**di_gen_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Deformation instrument identifier
2	**di_gen_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation instrument code
3	**ds_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	**cs_id**	smallint(5)		UNSIGNED	Yes	Null			Satellite ID
5	**di_gen_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Deformation instrument name
6	**di_gen_type**	enum('Angle', 'CGPS', 'EDM', 'EDM_Reflector', 'GPS', 'Total_Station', 'OtherTypes')			Yes	*NULL*			Deformation instrument type
7	**di_gen_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Units measured
8	**di_gen_res**	float			Yes	*NULL*			instrument resolution
9	**di_gen_stn**	float			Yes	*NULL*			Signal to noise
10	**di_gen_stime**	datetime			No	0000-00-00 00:00:00			Start time
11	**di_gen_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
12	**di_gen_etime**	datetime			No	9999-12-31 23:59:59			End time
13	**di_gen_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
14	**di_gen_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**di_gen_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments

16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**di_gen_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	**di_gen_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	di_gen_id	A	No	
CODE	BTREE	No	No	di_gen_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.4. di_tlt - Tilt/Strain instrument

This table stores information about each individual instrument and provides the necessary data to process raw data from the tilt and strain data tables.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	di_tlt_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt/strain instrument identifier
2	**di_tlt_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt/Strain instrument code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	**di_tlt_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Tilt/Strain instrument name
5	**di_tlt_type**	enum('Tilt', 'Strain')	*utf8_unicode_ci*		Yes	*NULL*			Tilt/strain instrument type
6	**di_tlt_depth**	float			Yes	*NULL*		m	Depth
7	**di_tlt_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Units measured
8	**di_tlt_res**	float			Yes	*NULL*			Resolution
9	**di_tlt_dir1**	float			Yes	*NULL*		°	Azimuth of direction 1 (or X for tiltmeter) 0-360°
10	**di_tlt_dir2**	float			Yes	*NULL*		°	Azimuth of direction 2 (or Y for tiltmeter) 0-360°
11	**di_tlt_dir3**	float			Yes	*NULL*		°	Azimuth of direction 3 (0-360°)
12	**di_tlt_dir4**	float			Yes	*NULL*		°	Azimuth of direction 4 (0-360°)

13	**di_tlt_econv1**	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 1
14	**di_tlt_econv2**	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 2
15	**di_tlt_econv3**	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 3
16	**di_tlt_econv4**	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 4
17	**di_tlt_stime**	datetime			No	0000-00-00 00:00:00			Start time
18	**di_tlt_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
19	**di_tlt_etime**	datetime			No	9999-12-31 23:59:59			End time
20	**di_tlt_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
21	**di_tlt_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
22	**di_tlt_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
23	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
24	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
25	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
26	**di_tlt_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	**di_tlt_pubdate**	datetime			Yes	*NULL*			the date the data become public
28	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
29	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	di_tlt_id	83	A	No	
CODE	BTREE	No	No	di_tlt_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F. DEFORMATION DATA

F.1. dd_tlt - Electronic tilt

This table contains tilt data that are either raw or processed. Most modern tilt data are collected electronically and continuously.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_tlt_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt data identifier
2	dd_tlt_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt data code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	di_tlt_id	smallint(5)		UNSIGNED	Yes	*NULL*			Tilt/Strain instrument identifier
5	dd_tlt_time	datetime			Yes	*NULL*			Measurement time
6	dd_tlt_timecsec	decimal(2,2)			Yes	*NULL*			Centisecond precision for measurement time
7	dd_tlt_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	dd_tlt_timecsec_unc	decimal(2,2)			Yes	*NULL*			Centisecond precision for measurement time uncertainty
9	dd_tlt_srate	double			Yes	*NULL*		sec	Sampling rate
10	dd_tlt1	double			Yes	*NULL*		µrad	Tilt measurement 1 or X (positive is down to the north)
11	dd_tlt2	double			Yes	*NULL*		µrad	Tilt measurement 2 or Y (postive is down to the east)
12	dd_tlt_err1	double			Yes	*NULL*			Tilt 1 error
13	dd_tlt_err2	double			Yes	*NULL*			Tilt 2 error
14	dd_tlt_proc_flg	enum('P', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Flag: P=Processed, R=Raw
15	dd_tlt_temp	Double			Yes	*NULL*			temperature
16	dd_tlt_bat	double			Yes	*NULL*			battery
17	dd_tlt_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
18	dd_tlt_com	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	dd_tlt_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	dd_tlt_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_tlt_id	A	No	
CODE	BTREE	No	No	dd_tlt_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.2. dd_tlv - Tilt vector

This table stores tilt information from sources where we do not have the raw or semi-processed data (i.e. the original data are no longer available) and only have access to tilt vectors.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_tlv_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt vector data identifier
2	**dd_tlv_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt vector data code
3	**ds_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	**di_tlt_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Tilt/Strain instrument identifier
5	**dd_tlv_stime**	datetime			Yes	*NULL*			Start time
6	**dd_tlv_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**dd_tlv_etime**	datetime			Yes	*NULL*			End time
8	**dd_tlv_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
9	**dd_tlv_mag**	float			Yes	*NULL*		µrad	Magnitude of the
10	**dd_tlv_azi**	float			Yes	*NULL*		°	Azimuth
11	**dd_tlv_magerr**	float			Yes	*NULL*		µrad	Magnitude error
12	**dd_tlv_azierr**	float			Yes	*NULL*		°	Azimuth error
13	**dd_tlv_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
14	**dd_tlv_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	**dd_tlv_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	**dd_tlv_pubdate**	datetime			Yes	*NULL*			the date the data become public
20	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_tlv_id	A	No	

CODE	BTREE	No	No	dd_tlv_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.3. dd_str - Strain

This table stores both raw and processed strainmeter data. The raw strain data are stored by component, as microstrain with a positive value for contraction and negative value for dilatation. The processed data i.e. volumetric strains are stored in this table in microstrain, shear strains is stored.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_str_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Strain data identifier
2	**dd_str_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Strain data code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	di_tlt_id	smallint(5)		UNSIGNED	Yes	*NULL*			Deformation instrument identifier
5	**dd_str_time**	datetime			Yes	*NULL*			Measurement time in UTC
6	**dd_str_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
7	**dd_str_comp1**	double			Yes	*NULL*		µstrain	Strainmeter component 1 (positive for contraction; negative for dilatation)
8	**dd_str_comp2**	double			Yes	*NULL*		µstrain	Strainmeter component 2 (positive for contraction; negative for dilatation)
9	**dd_str_comp3**	double			Yes	*NULL*		µstrain	Strainmeter component 3 (positive for contraction; negative for dilatation)
10	**dd_str_comp4**	double			Yes	*NULL*		µstrain	Strainmeter component 4 (positive for contraction; negative for dilatation)
11	**dd_str_err1**	double			Yes	*NULL*		µstrain	Strainmeter component 1 error
12	**dd_str_err2**	double			Yes	*NULL*		µstrain	Strainmeter component 2 error
13	**dd_str_err3**	double			Yes	*NULL*		µstrain	Strainmeter component 3 error
14	**dd_str_err4**	double			Yes	*NULL*		µstrain	Strainmeter component 4 error
15	**dd_str_vdstr**	double			Yes	*NULL*		µstrain	Volumetric strain change (positive for contraction; negative for dilatation)
16	**dd_str_vdstr_err**	double			Yes	*NULL*		µstrain	Volumetric strain change error

17	**dd_str_sstr_ax1**	double			Yes	*NULL*		µstrain	Shear strain of axis 1 (gamma-1)
18	**dd_str_azi_ax1**	float			Yes	*NULL*		°	Azimuth of axis 1 (gamma-1) in degrees (0-360°); measured from North with clockwise rotation as positive
19	**dd_str_sstr_ax2**	double			Yes	*NULL*		µstrain	Shear strain of axis 2 (gamma-2)
20	**dd_str_azi_ax2**	float			Yes	*NULL*		°	Azimuth of axis 2 (gamma-2) in degrees (0-360°); measured from North with clockwise rotation as positive
21	**dd_str_sstr_ax3**	double			Yes	*NULL*		µstrain	Shear strain of axis 3 (gamma-3)
22	**dd_str_azi_ax3**	float			Yes	*NULL*		°	Azimuth of axis 3 (gamma-3) in degrees (0-360°); measured from North with clockwise rotation as positive
23	**dd_str_stderr1**	double			Yes	*NULL*		µstrain	Strain for axis 1 uncertainty
24	**dd_str_stderr2**	double			Yes	*NULL*		µstrain	Strain for axis 2 uncertainty
25	**dd_str_stderr3**	double			Yes	*NULL*		µstrain	Strain for axis 3 uncertainty
26	**dd_str_pmax**	double			Yes	*NULL*		µstrain	Maximum principal strain
27	**dd_str_pmaxerr**	double			Yes	*NULL*		µstrain	Maximum principal strain uncertainty
28	**dd_str_pmin**	double			Yes	*NULL*		µstrain	Minimum principal strain
29	**dd_str_pminerr**	double			Yes	*NULL*		µstrain	Minimum principal strain uncertainty
30	**dd_str_pmax_dir**	float			Yes	*NULL*		°	Maximum principal strain direction
31	**dd_str_pmax_direrr**	float			Yes	*NULL*		°	Maximum principal strain direction uncertainty
32	**dd_str_pmin_dir**	float			Yes	*NULL*		°	Minimum principal strain direction
33	**dd_str_pmin_direrr**	float			Yes	*NULL*		°	Minimum principal strain direction uncertainty
34	**dd_str_bpres**	float			Yes	*NULL*		bar	Barometric pressure
35	**dd_str_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
36	**dd_str_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
37	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
38	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
39	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
40	**dd_str_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
41	**dd_str_pubdate**	datetime			Yes	*NULL*			the date the data become public
42	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
43	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_str_id	A	No	
CODE	BTREE	No	No	dd_str_code	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.4. dd_edm - EDM

This table contains Electronic Distance measurement (EDM) data that were collected between two stations, an instrument station and a target or reflector station. EDM is generally collected as part of a campaign but is also possible collected continuously.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_edm_id**	mediumint(8)		UN-SIGNED	No	*None*	AUTO_INCRE-MENT		EDM data identifier
2	**dd_edm_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			EDM data code
3	**di_gen_id**	mediumint(8)		UN-SIGNED	Yes	*NULL*			General deformation in-strument identifier
4	**ds_id1**	mediumint(8)		UN-SIGNED	Yes	*NULL*			EDM instrument station identifier
5	**ds_id2**	mediumint(8)		UN-SIGNED	Yes	*NULL*			Target (refector/mirror) station identifier
6	**dd_edm_time**	datetime			Yes	*NULL*			Measurement time
7	**dd_edm_time_unc**	datetime			Yes	*NULL*			Measurement time uncer-tainty
8	**dd_edm_line**	double			Yes	*NULL*		m	Measured line length
9	**dd_edm_cerr**	float			Yes	*NULL*		m	Constant error (indicator of instrument and reflect-or error)
10	**dd_edm_serr**	float			Yes	*NULL*		ppm	Scale error (indicator of error in line length due to temperature and pres-sure)
11	**dd_edm_ori**	enum('D', 'O')	*utf8_unico de_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
12	**dd_edm_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Comments
13	**cc_id**	smallint(5)		UN-SIGNED	Yes	*NULL*			First owner ID
14	**cc_id2**	smallint(5)		UN-SIGNED	Yes	*NULL*			Second owner ID
15	**cc_id3**	smallint(5)		UN-	Yes	*NULL*			Third owner ID

				SIGNED					
16	**dd_edm_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
17	**dd_edm_pubdate**	datetime			Yes	*NULL*			the date the data become public
18	**cc_id_load**	smallint(5)		UN-SIGNED	Yes	*NULL*			contact ID for the person who entered the data
19	**cb_ids**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to bibli-ography table (cb), separ-ated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_edm_id	A	No	
CODE	BTREE	No	No	dd_edm_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id1	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.5. dd_ang - Angle

This table contains a few angles from early geodetic surveys where someone would stand on a high point (on top of a mountain) and measure the horizontal and vertical angles to prominent features in the area.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_ang_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Deformation angle data
2	**dd_ang_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation angle code
3	**di_gen_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instru-ment identifier
4	**ds_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Theodolite/total station in-strument identifier
5	**ds_id1**	mediumint(8)		UNSIGNED	Yes	*NULL*			Target station 1 ID
6	**ds_id2**	mediumint(8)		UNSIGNED	Yes	*NULL*			Target station 2 ID
7	**dd_ang_time**	datetime			Yes	*NULL*			Measurement time
8	**dd_ang_time_unc**	datetime			Yes	*NULL*			Measurement time uncer-tainty
9	**dd_ang_hort1**	float			Yes	*NULL*		°	Horizontal angle to target 1, as measured by theodolite/total-station (0-360°)
10	**dd_ang_hort2**	float			Yes	*NULL*		°	Horizontal angle to target 2, as measured by theodolite/total-station (0-360°)
11	**dd_ang_vert1**	float			Yes	*NULL*		°	Vertical angle to target 1, as

									measured by theodolite/total-station (0-360°)
12	**dd_ang_vert2**	float			Yes	*NULL*		°	Vertical angle to target 2, as measured by theodolite/total-station (0-360°)
13	**dd_ang_herr1**	float			Yes	*NULL*		°	Error on horizontal angle to target-1
14	**dd_ang_herr2**	float			Yes	*NULL*		°	Error on horizontal angle to target-2
15	**dd_ang_verr1**	float			Yes	*NULL*		°	Error on vertical angle to target-1
16	**dd_ang_verr2**	float			Yes	*NULL*		°	Error on vertical angle to target-2
17	**dd_ang_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
18	**dd_ang_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	**dd_ang_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	**dd_ang_pubdate**	datetime			Yes	*NULL*			the date the data become public
24	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_ang_id	A	No	
CODE	BTREE	No	No	dd_ang_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id	ds.ds_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.6. dd_gps - GPS

This table contains continuous and periodic data of GPS positions, collected at a single station and referenced to other station(s).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_gps_id	mediumint(8)		UNSIGNED	No	*None*	AUTO AUTOINCRE		GPS data identifier
2	dd_gps_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			GPS data code
3	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
4	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS station identifier
5	ds_id_ref1	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS reference station-1 identifier
6	ds_id_ref2	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS reference station-2 identifier
7	dd_gps_time	datetime			Yes	*NULL*			Measurement time
8	dd_gps_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
9	dd_gps_lat	double			Yes	*NULL*		°	GPS latitude measurement (+/- xx.xxxxxxxxx)
10	dd_gps_lon	double			Yes	*NULL*		°	GPS longitude measurement (+/- xx.xxxxxxxxx)
11	dd_gps_elev	double			Yes	*NULL*		m	Elevation above sea level
12	dd_gps_nserr	double			Yes	*NULL*		°	N-S error
13	dd_gps_ewerr	double			Yes	*NULL*		°	E-W error
14	dd_gps_verr	float			Yes	*NULL*		m	Vertical error
15	dd_gps_software	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			The software used to determine the position (e.g. GIPSY, BERNESE, GAMIT, etc.)
16	dd_gps_orbits	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Orbits used to determine the positions
17	dd_gps_dur	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		min	Duration of the solution (frequency of measurement and duration of time used to calculate each position)
18	dd_gps_qual	enum('E', 'G', 'P', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Quality: E=Excellent, G=Good, P=Poor, U=Unknown
19	dd_gps_slope	float			Yes	*NULL*			Slope/distance/baseline change
20	dd_gps_errslope	float			Yes	*NULL*			Slope/distance/baseline error
21	dd_gps_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
22	dd_gps_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
23	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
24	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
25	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
26	dd_gps_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	dd_gps_pubdate	datetime			Yes	*NULL*			the date the data become public
28	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
29	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_gps_id	A	No	
CODE	BTREE	No	No	dd_gps_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id	ds.ds_id
ds_id_ref1	ds.ds_id
ds_id_ref2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.7. dd_gpv - GPS vector

This table contains displacement vectors that were computed from GPS data, processed from the actual position data. The displacement vector can be described in terms of North-, East-, and Vertical displacement (mm). But it can be also described by displacement magnitude (mm), azimuth (0-360°), and vector inclination (0-90°).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_gpv_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		GPS vector data identifier
2	**dd_gpv_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			GPS vector data code
3	**di_gen_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
4	**ds_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS station identifier
5	**dd_gpv_stime**	datetime			Yes	*NULL*			Start time
6	**dd_gpv_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**dd_gpv_etime**	datetime			Yes	*NULL*			End time
8	**dd_gpv_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
9	**dd_gpv_dmag**	float			Yes	*NULL*		mm	Displacement magnitude
10	**dd_gpv_daz**	float			Yes	*NULL*		°	Displacement azimuth (0-360°)
11	**dd_gpv_vincl**	float			Yes	*NULL*		°	Inclination of displacement vector (0-90°)
12	**dd_gpv_N**	float			Yes	*NULL*		mm	North displacement
13	**dd_gpv_E**	float			Yes	*NULL*		mm	East displacement
14	**dd_gpv_vert**	float			Yes	*NULL*		mm	Vertical displacement
15	**dd_gpv_dherr**	float			Yes	*NULL*		mm	horizontal uncertainty
16	**dd_gpv_dnerr**	float			Yes	*NULL*		mm	North displacement uncertainty
17	**dd_gpv_deerr**	float			Yes	*NULL*		mm	East displacement uncertainty
18	**dd_gpv_dverr**	float			Yes	*NULL*		mm	Vertical uncertainty
19	**dd_gpv_refFrame**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Reference Frame

20	**dd_gpv_projection**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Projection name
21	**dd_gpv_ellipsoid**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Ellipsoid name
22	**dd_gpv_datum**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Datum name
23	**dd_gpv_refPosLat**	decimal(10,0)			Yes	*NULL*		°	GPS Reference Position (Latitude)
24	**dd_gpv_refPosLon**	decimal(10,0)			Yes	*NULL*		°	GPS Reference Position (Longitude)
25	**dd_gpv_refPosElev**	decimal(10,0)			Yes	*NULL*		m	GPS Reference Position (Elevation)
26	**dd_gpv_staVelNorth**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity (North)
27	**dd_gpv_staVelNorthErr**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity error (North)
28	**dd_gpv_staVelEast**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity (East)
29	**dd_gpv_staVelEastErr**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity error (East)
30	**dd_gpv_staVelVert**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity (Vertical)
31	**dd_gpv_staVelVertErr**	decimal(10,0)			Yes	*NULL*		mm/yr	GPS station velocity error (Vertical)
32	**dd_gpv_dataType**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of data, reflect data processing level
33	**dd_gpv_arch**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Data archive location
34	**dd_gpv_software**	text	*utf8_unicode_ci*		Yes	*NULL*			The software used to process data
35	**dd_gpv_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
36	**dd_gpv_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
37	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
38	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
39	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
40	**dd_gpv_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
41	**dd_gpv_pubdate**	datetime			Yes	*NULL*			the date the data become public
42	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
43	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_gpv_id	A	No	
CODE	BTREE	No	No	dd_gpv_code	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.8. dd_lev - Leveling

This table contains data of elevation changes between successive benchmarks on a leveling line.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_lev_id	mediumint(8)		UN-SIGNED	No	*None*	AUTO_INCRE-MENT		Leveling data identifier
2	**dd_lev_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Leveling data code
3	di_gen_id	mediumint(8)		UN-SIGNED	Yes	*NULL*			General deformation in-strument ID
4	ds_id_ref	mediumint(8)		UN-SIGNED	Yes	*NULL*			Reference benchmark ID
5	ds_id1	mediumint(8)		UN-SIGNED	Yes	*NULL*			First benchmark (n) ID
6	ds_id2	mediumint(8)		UN-SIGNED	Yes	*NULL*			Second benchmark (n+1) ID
7	**dd_lev_ord**	mediumint(9)			Yes	*NULL*			the order of the survey
8	**dd_lev_class**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			the class of the survey
9	**dd_lev_time**	datetime			Yes	*NULL*			Survey date
10	**dd_lev_time_unc**	datetime			Yes	*NULL*			Survey date uncertainty
11	**dd_lev_delev**	float			Yes	*NULL*		mm	Elevation change from the first benchmark to the second benchmark
12	**dd_lev_herr**	float			Yes	*NULL*		mm	Elevation change uncer-tainty
13	**dd_lev_ori**	enum('D', 'O')	*utf8_unico de_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
14	**dd_lev_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UN-SIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UN-SIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UN-SIGNED	Yes	*NULL*			Third owner ID
18	**dd_lev_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	**dd_lev_pubdate**	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UN-SIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_uni-*		Yes	*NULL*			List of cb_ids, link to bibli-

			code_ci						ography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_lev_id	A	No	
CODE	BTREE	No	No	dd_lev_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id_ref	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id_ref	ds.ds_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.9. dd_sar - InSAR image

This table contains information about radar interferograms that show deformation of volcanoes. Only select, processed interferograms are included in WOVOdat. A separate InSAR-Satellite (j_sarsat) relationship table is available for cases where different satellite were used. The data used to create the interferogram are stored in the InSAR data table (dd_srd).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_sar_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR image identifier
2	**dd_sar_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			InSAR image code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**di_gen_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
5	**cs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Satellite ID
6	**dd_sar_slat**	double			Yes	*NULL*		°	The latitude in the starting corner
7	**dd_sar_slon**	double			Yes	*NULL*		°	The longitude in the starting corner
8	**dd_sar_spos**	enum('BLC', 'TLC')	*utf8_unicode_ci*		Yes	*NULL*			Starting position: BLC=Bottom Left Corner, TLC=Top Left Corner
9	**dd_sar_rord**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			the order of the row (e.g. left to right)
10	**dd_sar_nrows**	smallint(5)		UNSIGNED	Yes	*NULL*			The number of rows in the image
11	**dd_sar_ncols**	smallint(5)		UNSIGNED	Yes	*NULL*			The number of columns in the image
12	**dd_sar_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			The units used in the image (e.g. mm)
13	**dd_sar_ndata**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Null data value

14	**dd_sar_loc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location name of the image (e.g. Yellow-stone)
15	**dd_sar_pair**	enum('P', 'S', 'U')	*utf8_unicode_ci*		Yes	*NULL*			A flag indicating if th eimage is composed of: P=Pair, S=Stacked, U=Un-known
16	**dd_sar_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	**dd_sar_dem**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			The DEM used
18	**dd_sar_dord**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			The order in which the bytes are stored (e.g. big endian or little en-dian)
19	**dd_sar_img1_time**	datetime			Yes	*NULL*			Date-time of the im-age 1 was taken
20	**dd_sar_img1_time_unc**	datetime			Yes	*NULL*			Date of image 1 un-certainty
21	**dd_sar_img2_time**	datetime			Yes	*NULL*			Date-time of the im-age 2 was taken
22	**dd_sar_img2_time_unc**	datetime			Yes	*NULL*			Date of image 2 un-certainty
23	**dd_sar_pixsiz**	float			Yes	*NULL*		m	Pixel size
24	**dd_sar_spacing**	float			Yes	*NULL*		°	Spacing of rows and columns (in decimal degrees)
25	**dd_sar_lookang**	float			Yes	*NULL*		°	the look angle
26	**dd_sar_limb**	enum('ASC', 'DES')	*utf8_unicode_ci*		Yes	*NULL*			Limb: ASC=Ascend-ing, DES=Descending
27	**dd_sar_img_path**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link where the in-terferogram image is stored
28	**dd_sar_geotiff**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link where the GeoTIFF of interfero-gram is stored
29	**dd_sar_prometh**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Processing method
30	**dd_sar_softwr**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Software used
31	**dd_sar_dem_qual**	enum('E', 'G', 'F', 'U')	*utf8_unicode_ci*		Yes	*NULL*			DEM quality: E=Excel-lent (1m), G=Good (10m), F=Fair (100m), U=Unknown
32	**dd_sar_ori**	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observat-ory
33	**dd_sar_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
34	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
35	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
36	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
37	**dd_sar_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
38	**dd_sar_pubdate**	datetime			Yes	*NULL*			the date the data be-come public
39	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the per-son who entered the data
40	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_sar_id	A	No	
CODE	BTREE	No	No	dd_sar_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
cs_id	BTREE	No	No	cs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
di_gen_id	di_gen.di_gen_id
cs_id	cs.cs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.9.a. j_sarsat - InSAR-satellite junction

This table was created for the many-to-many relationship between the satellite data and the InSAR data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**j_sarsat_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR satellite junction ID
2	**dd_sar_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			InSAR image ID
3	**cs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite identifier
4	**j_sarsat_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
5	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	j_sarsat_id	A	No	
LINK	BTREE	Yes	No	dd_sar_id	A	Yes	
				cs_id	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cs_id	cs.cs_id
cc_id_load	cc.cc_id

F.9.b. dd_srd - InSAR Data pixel

This table contains the data collected by two satellites to create an InSAR image.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**dd_srd_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR data ID
2	**dd_sar_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			InSAR image ID
3	**dd_srd_numb**	int(10)		UNSIGNED	Yes	*NULL*			pixel number
4	**dd_srd_dchange**	float			Yes	*NULL*		mm	Range of change
5	**dd_srd_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
6	**dd_srd_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)

7	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_srd_id	A	No	
PIXEL NUMBER	BTREE	Yes	No	dd_sar_id	A	Yes	
				dd_srd_numb	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cc_id_load	cc.cc_id

G. FIELDS MONITORING SYSTEM

G.1. cn - Common network (for Fields network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Common network identifier
2	**cn_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**cn_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	**cn_type**	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	**cn_area**	float			Yes	*NULL*		km^2	Network area coverage
7	**cn_map**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	**cn_stime**	datetime			No	0000-00-00 00:00:00			Start time
9	**cn_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
10	**cn_etime**	datetime			No	9999-12-31 23:59:59			End time
11	**cn_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
12	**cn_utc**	float			Yes	*NULL*			Difference from UTC
13	**cn_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	**cn_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**cn_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**cn_loaddate**	datetime			No	*None*			the date the data was entered (in UTC)
20	**cn_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

G.2. fs - Fields station

This table stores information and description of the stations where fields data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**fs_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Fields satation identifier
2	**fs_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Fields station code
3	**cn_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Fields network ID
4	**fs_name**	varchar(50)	*utf8_uni-code_ci*		Yes	*NULL*			Fields station name
5	**fs_lat**	double			Yes	*NULL*		°	Latitude
6	**fs_lon**	double			Yes	*NULL*		°	Longitude
7	**fs_elev**	float			Yes	*NULL*		m	Elevation
8	**fs_inst**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of instruments
9	**fs_utc**	float			Yes	*NULL*			Difference from UTC
10	**fs_stime**	datetime			No	0000-00-00 00:00:00			Start date
11	**fs_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
12	**fs_etime**	datetime			No	1999-12-31 23:59:00			End date
13	**fs_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
14	**fs_desc**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Description
15	**fs_ori**	enum('D','O')	*utf8_uni-code_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from obser-vatory)
16	**fs_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Comments
17	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
19	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	**fs_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	**fs_pubdate**	datetime			Yes	*NULL*			the date the data become public
22	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	**cb_ids**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fs_id	A	No	
CODE	BTREE	No	No	fs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

G.3. fi - Fields instrument

This table stores information about the instruments used to collect magnetic, electric, and gravity data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**fi_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Fields instrument identifier
2	**fi_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Fields instrument code
3	**fs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	**fi_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manu-facturer of the field instrument (recorder)
5	**fi_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The type of instrument(s)
6	**fi_res**	float			Yes	*NULL*			The resolution of each individual instrument in the instrument package
7	**fi_units**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The units each instrument measures
8	**fi_rate**	float			Yes	*NULL*			The sampling rate for the instru-ment(s)
9	**fi_filter**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The filter type, if applicable
10	**fi_orient**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The orientation of the instru-ment, if applicable
11	**fi_calc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Any processing used to convert, clean or correct te raw data. Please note the correctios made.
12	**fi_stime**	datetime			No	0000-00-00 00:00:00			Start time
13	**fi_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
14	**fi_etime**	datetime			No	1999-12-31 23:59:00			End time
15	**fi_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
16	**fi_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from observatory)
17	**fi_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	**fi_loaddate**	datetime			Yes	*NULL*			the date the data was entered

									(in UTC)
22	**fi_pubdate**	datetime			Yes	*NULL*			the date the data become public
23	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fi_id	A	No	
CODE	BTREE	No	No	fi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H. FIELDS DATA

H.1. fd_ele - Electric fields

This table contains electric data in digital form. There are two reference stations used for self potential (SP) observation, and single field instrument for all campaign data. If the bandpass filter used, enter the high value in the fd_ele_lpass and the low value in the fd_ele_hpass.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**fd_ele_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Electric data identifier
2	**fd_ele_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Electric data code
3	**fs_id1**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier (reference station in which the electrode is subtracted, station A in the equation A-B)
4	**fs_id2**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier (reference station in which the electrode being subtracted, station B in the equation A-B)
5	**fi_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields instrument identifier (for non-permanent/campaign)
6	**fd_ele_time**	datetime			Yes	*NULL*			Measurement time
7	**fd_ele_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
8	**fd_ele_field**	float			Yes	*NULL*		mV	The electric field measurement
9	**fd_ele_ferr**	float			Yes	*NULL*		mV	electric field measurement uncertainty
10	**fd_ele_dir**	float			Yes	*NULL*		°	The direction from station-1

									to station-2 (0-360° from North)
11	**fd_ele_hpass**	float			Yes	*NULL*		Hz	High pass filter frequency
12	**fd_ele_lpass**	float			Yes	*NULL*		Hz	Low pass filter frequency
13	**fd_ele_spot**	float			Yes	*NULL*		mV	Self potential between station A and B (1-2 or A-B)
14	**fd_ele_spot_err**	float			Yes	*NULL*		mV	Self potential uncertainty
15	**fd_ele_ares**	float			Yes	*NULL*		Ω m	Apparent resistivity
16	**fd_ele_ares_err**	float			Yes	*NULL*		Ω m	Apparent resistivity uncertainty
17	**fd_ele_dres**	float			Yes	*NULL*		Ω m	Direct resistivity
18	**fd_ele_dres_err**	float			Yes	*NULL*		Ω m	Direct resistivity uncertainty
19	**fd_ele_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from observatory)
20	**fd_ele_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			First owner ID
21	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			the date the data was entered (in UTC)
24	**fd_ele_loaddate**	datetime			Yes	*NULL*			the date the data become public
25	**fd_ele_pubdate**	datetime			Yes	*NULL*			contact ID for the person who entered the data
26	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma
27	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to bibliography table

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_ele_id	A	No	
CODE	BTREE	No	No	fd_ele_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION 1	BTREE	No	No	fs_id1	A	Yes	

Links

Field	Link to
fs_id1	fs.fs_id
fs_id2	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.2. fd_gra - Gravity

This table contains gravity data such as field strength and associated vertical displacement.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**fd_gra_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Gravity data identfier
2	**fd_gra_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			gravity data code
3	**fs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier

4	fs_id_ref	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields reference station ID for gravity measurement
5	fi_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Gravity fields instrument ID
6	fd_gra_time	datetime			Yes	*NULL*			Measurement time
7	fd_gra_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	fd_gra_fstr	double			Yes	*NULL*		Gal	Field strength
9	fd_gra_ferr	double			Yes	*NULL*		Gal	Strength uncertainty
10	fd_gra_vdisp	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Associated vertical displacement: Y=Yes, N=No, U=Unknown
11	fd_gra_gwater	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Associated change in groundwater level: Y=Yes, N=No, U=Unknown
12	fd_gra_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from observatory)
13	fd_gra_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
15	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	fd_gra_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	fd_gra_pubdate	datetime			Yes	*NULL*			the date the data become public
19	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_gra_id	A	No	
CODE	BTREE	No	No	fd_gra_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
fs_id_ref	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.3. fd_mag - Magnetic fields

This table contains magnetic data that were collected digitally.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fd_mag_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magnetic field trength ID

2	**fd_mag_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magnetic field data code
3	**fs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	**fs_id_ref**	mediumint(8)		UNSIGNED	Yes	*NULL*			Magnetic reference station ID
5	**fi_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Magnetic fields instrument ID
6	**fd_mag_time**	datetime			Yes	*NULL*			Measurement time
7	**fd_mag_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
8	**fd_mag_f**	double			Yes	*NULL*		nT	The total magnetic field strength (F)
9	**fd_mag_compx**	double			Yes	*NULL*		nT	The X-component of magnetic field strength
10	**fd_mag_compy**	double			Yes	*NULL*		nT	The Y-component of magnetic field strength
11	**fd_mag_compz**	double			Yes	*NULL*		nT	The Z-component of magnetic field strength
12	**fd_mag_ferr**	float			Yes	*NULL*		nT	Total field strength uncertainty
13	**fd_mag_errx**	float			Yes	*NULL*		nT	uncertainty in the X-component
14	**fd_mag_erry**	float			Yes	*NULL*		nT	uncertainty in the Y-component
15	**fd_mag_errz**	float			Yes	*NULL*		nT	uncertainty in the Z-component
16	**fd_mag_highpass**	float			Yes	*NULL*		Hz	High pass filter frequency
17	**fd_mag_lowpass**	float			Yes	*NULL*		Hz	Low pass filter frequency
18	**fd_mag_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from observatory)
19	**fd_mag_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	**fd_mag_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	**fd_mag_pubdate**	datetime			Yes	*NULL*			the date the data become public
25	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_mag_id	A	No	
CODE	BTREE	No	No	fd_mag_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	

OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
fs_id_ref	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.4. fd_mgv - Magnetic vector

This table contains magnetic vector data for which the data for the individual components is unavailable.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**fd_mgv_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magnetic vector identifier
2	**fd_mgv_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magnetic vector code
3	**fs_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	**fi_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Magnetic field instrument identifier
5	**fd_mgv_time**	datetime			Yes	*NULL*			Measurement time
6	**fd_mgv_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
7	**fd_mgv_dec**	float			Yes	*NULL*		°	Measured declination (0-360°)
8	**fd_mgv_incl**	float			Yes	*NULL*		°	Measured inclination (0-360°)
9	**fd_mgv_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (**D**=digitized from references **O**=original from observatory)
10	**fd_mgv_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
11	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
12	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
13	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
14	**fd_mgv_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
15	**fd_mgv_pubdate**	datetime			Yes	*NULL*			the date the data become public
16	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
17	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_mgv_id	0	A	No	
CODE	BTREE	No	No	fd_mgv_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	

STATION	BTREE	No	No	fs_id		A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I. GAS MONITORING SYSTEM

I.1. cn - Common network (gas network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	**cn_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**cn_name**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Common network name
5	**cn_type**	enum('Deformation','Fields','Gas','Hydrolo-gic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	**cn_area**	float			Yes	*NULL*		km^2	Network area coverage
7	**cn_map**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	**cn_stime**	datetime			No	0000-00-00 00:00:00			Start time
9	**cn_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
10	**cn_etime**	datetime			No	9999-12-31 23:59:59			End time
11	**cn_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
12	**cn_utc**	float			Yes	*NULL*			Difference from UTC
13	**cn_desc**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Description
14	**cn_ori**	enum('D','O')	*utf8_uni-code_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**cn_com**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**cn_loaddate**	datetime			No	*None*			the date the data was entered (in UTC)
20	**cn_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	

CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I.2. gs - Gas station

This table stores information such as a location, type of gas body monitored, and a description of the stations where gas data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**gs_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Gas station identifier
2	**gs_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas station code
3	**gs_name**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Gas station name
4	**cn_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Gas network index
5	**gs_lat**	double			Yes	*NULL*		°	Latitude
6	**gs_lon**	double			Yes	*NULL*		°	Longitude
7	**gs_elev**	float			Yes	*NULL*		m	Elevation
8	**gs_inst**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments installed in this site
9	**gs_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of gas body found at the station (fumarole, diffuse soil degassing, remote plume)
10	**gs_utc**	float			Yes	*NULL*			Difference from UTC
11	**gs_stime**	datetime			No	0000-00-00 00:00:00			
12	**gs_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
13	**gs_etime**	datetime			No	9999-12-31 23:59:59			
14	**gs_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
15	**gs_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
16	**gs_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
17	**gs_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	**gs_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	**gs_pubdate**	datetime			Yes	*NULL*			the date the data become public
23	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gs_id	A	No	
CODE	BTREE	Yes	No	gs_code	A	Yes	
				cc_id	A	Yes	
				gs_stime	A	No	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I.3. gi - Gas instrument

This table stores information about the instruments used to collect ground-based and remote gas data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**gi_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		gas instrument identifier
2	**gi_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas instrument code
3	**cs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID, if the instrument is mounted on a satellite or airplane.
4	**gs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station identifier
5	**gi_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of instrument
6	**gi_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the gas instrument (recorder)
7	**gi_units**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
8	**gi_pres**	float			Yes	*NULL*			Resolution
9	**gi_stn**	float			Yes	*NULL*			Signal to noise
10	**gi_calib**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Calibration
11	**gi_stime**	datetime			No	0000-00-00 00:00:00			Start date
12	**gi_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
13	**gi_etime**	datetime			No	9999-12-31 23:59:59			End date
14	**gi_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
15	**gi_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
16	**gi_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
19	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	**gi_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	**gi_pubdate**	datetime			Yes	*NULL*			the date the data become public
22	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gi_id	A	No	
CODE	BTREE	No	No	gi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
SATELLITE	BTREE	No	No	cs_id	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
cs_id	cs.cs_id
gs_id	gs.gs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J. GAS DATA

J.1. gd - Directly sampled gas

This table stores gas concentration data collected from a point source at ground sites. The type of point source is defined in the station table. Data include the gas temperature, concentrations, and environmental factors. Directly sampled gas can be collected either continuously or periodically. The species of gas reported can be from one of these possibilities:

- CO_2, SO_2, H_2S, HCl, HF, CH_4, H_2, CO, O_2 (in %w or %vol)
- $^3He/^4He$, $\delta^{13}C$, $\delta^{34}S$, $\delta^{18}O$, δD (in “per mil”)

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gd_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Directly sampled gas ID
2	**gd_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Directly sampled gas code
3	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station identifier
4	gi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument identifier
5	**gd_time**	datetime			Yes	*NULL*			Sampling/Measurement time
6	**gd_time_unc**	datetime			Yes	*NULL*			Sampling/Measurement time uncertainty
7	**gd_gtemp**	float			Yes	*NULL*		°C	Gas temperature
8	**gd_bp**	float			Yes	*NULL*		mbar	Atmospheric pressure at the time of the measurement
9	**gd_flow**	float			Yes	*NULL*			Measured gas emission rate
10	**gd_species**	enum('CO2', 'SO2', enum('CO2','SO2','H2S','HCl','HF','CH4','H2','CO','3He4He','d13C','d34S','d18O','dD','O2')			Yes	*NULL*			Species or ratio of gas reported (CO_2, SO_2, H_2S, HCl, HF, CH_4, H_2, CO, O_2, $^3He/^4He$, $d^{13}C$, $d^{34}S$, $d^{18}O$, dD)
11	**gd_waterfree_flag**	enum('Y', 'N')	*utf8_unicode_ci*		Yes	*NULL*			Water free gas: Y=Yes, N=No
12	**gd_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		%w or %vol or per mil	Reported units
13	**gd_concentration**	float			Yes	*NULL*			Gas concentration
14	**gd_concentration_err**	float			Yes	*NULL*			Gas concentration uncertainty
15	**gd_recalc**	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value: O=Original, R=Recalculated

16	**gd_envir**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Environmental factors
17	**gd_submin**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Information on sublimate minerals
18	**gd_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
19	**gd_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	**gd_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	**gd_pubdate**	datetime			Yes	*NULL*			the date the data become public
25	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_id	A	No	
CODE	BTREE	No	No	gd_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
gs_id	gs.gs_id
gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J.2. gd_plu - Plume

This table stores gas data collected (continuously or periodically) from a plume including the location of the vent, the height of the plume, and the gas emission rates.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**gd_plu_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Gas plume data identifier
2	**gd_plu_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas plume data code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**cs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
5	**gs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station ID
6	**gi_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument ID
7	**gd_plu_lat**	double			Yes	*NULL*		°	Latitude of the vent in decimal degrees
8	**gd_plu_lon**	double			Yes	*NULL*		°	Longitude of the vent in decimal degrees
9	**gd_plu_height**	float			Yes	*NULL*		km	Height of the plume in km

									above the vent
10	**gd_plu_hdet**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			the method used to measure the height
11	**gd_plu_time**	datetime			Yes	*NULL*			Measurement time in UTC
12	**gd_plu_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
13	**gd_plu_species**	enum('CO2', 'SO2', 'H2S', 'HCl', 'HF', 'CO')	*utf8_unicode_ci*		Yes	*NULL*			Species of gas reported (CO_2, SO_2, H_2S, HCl, HF, and CO)
14	**gd_plu_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		t/d or kg/s	Reported units
15	**gd_plu_emit**	float			Yes	*NULL*			Gas emision rate
16	**gd_plu_emit_err**	float			Yes	*NULL*			Emission rate uncertainty
17	**gd_plu_recalc**	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value flag: O=Original(value directly from measurement), R=Recalculated(value recalculated from other parameter)
18	**gd_plu_wind**	float			Yes	*NULL*		m/s	Wind speed
19	**gd_plu_wsmin**	Float			Yes	*NULL*		m/s	Minimum wind speed
20	**gd_plu_wsmax**	Float			Yes	*NULL*		m/s	Maximum wind speed
21	**gd_plu_wdir**	Varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		°	Dominant wind direction
22	**gd_plu_weth**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Weather notes
23	**gd_plu_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
24	**gd_plu_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
25	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
26	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
27	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
28	**gd_plu_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
29	**gd_plu_pubdate**	datetime			Yes	*NULL*			the date the data become public
30	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
31	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_plu_id	A	No	
CODE	BTREE	No	No	gd_plu_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cs_id	cs.cs_id
gs_id	gs.gs_id

gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J.3. gd_sol - Soil efflux

This table stores a daily total flux value for an individual gas species.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gd_sol_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Soil Efflux data ID
2	**gd_sol_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Soil Efflux code
3	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station ID
4	gi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument ID
5	**gd_sol_time**	datetime			Yes	*NULL*			Measurement time
6	**gd_sol_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
7	**gd_sol_species**	enum('CO2','SO2','H2S','HCl','HF','CH4','H2','CO','3He4He','d13C','d34S','d18O','dD','NH3','N2','Ar')	*utf8_unicode_ci*		Yes	*NULL*			Mesured species (CO_2, Radon, etc.)
8	**gd_sol_tflux**	float			Yes	*NULL*		t/d	Total flux
9	**gd_sol_flux_err**	float			Yes	*NULL*		t/d	Total flux uncertainty
10	**gd_sol_pts**	smallint(5)		UNSIGNED	Yes	*NULL*			Number of points
11	**gd_sol_area**	float			Yes	*NULL*		m^2	The area measured
12	**gd_sol_high**	float			Yes	*NULL*		$g/m^2/d$	Highest individual flux
13	**gd_sol_htemp**	float			Yes	*NULL*		°C	Highest temperature
14	**gd_sol_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Reported units
15	**gd_sol_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
16	**gd_sol_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*		m/s	Second owner ID
19	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	**gd_sol_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	**gd_sol_pubdate**	datetime			Yes	*NULL*			the date the data become public
22	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

23	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_sol_id	A	No	
CODE	BTREE	No	No	gd_sol_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
gs_id	gs.gs_id
gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K. HYDROLOGIC MONITORING SYSTEM

The hydrology section of WOVOdat contains water monitoring data that are collected from water wells, springs, or crater lakes, all broadly indicative of groundwater conditions and possible role of groundwater in volcanic unrest.

K.1. cn - Common network (Hydrologic network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Common network identifier
2	**cn_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	**cn_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	**cn_type**	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	**cn_area**	float			Yes	*NULL*		km^2	Network area coverage
7	**cn_map**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	**cn_stime**	datetime			No	0000-00-00 00:00:00			Start time
9	**cn_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
10	**cn_etime**	datetime			No	9999-12-31 23:59:59			End time
11	**cn_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
12	**cn_utc**	float			Yes	*NULL*			Difference from UTC
13	**cn_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	**cn_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory

15	**cn_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**cn_loaddate**	datetime			No	*None*			the date the data was entered (in UTC)
20	**cn_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K.2. hs - Hydrologic station

This table stores information such as location, type of water body, and descriptions for stations where hydrologic data are collected. There are often multiple instruments at a station and some observatories may use an instrument at multiple stations; therefore the instrument will be linked directly to the hydrologic data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**hs_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic station ID
2	**hs_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic station code
3	**cn_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic network ID
4	**hs_lat**	double			Yes	*NULL*		°	Latitude
5	**hs_lon**	double			Yes	*NULL*		°	Longitude
6	**hs_elev**	float			Yes	*NULL*		m	Elevation
7	**hs_perm**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
8	**hs_name**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic station name
9	**hs_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of water body (well, lake, spring, etc.)
10	**hs_utc**	float			Yes	*NULL*			Difference from UTC
11	**hs_tscr**	float			Yes	*NULL*		m	Top of screen (top of the interval open to inflow in meter below the surface)
12	**hs_bscr**	float			Yes	*NULL*		m	Bottom of screen (top of

									the interval open to inflow in meter below the surface)
13	**hs_tdepth**	double			Yes	*NULL*		m	Total depth of well
14	**hs_stime**	datetime			No	0000-00-00 00:00:00			Start date
15	**hs_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
16	**hs_etime**	datetime			No	9999-12-31 23:59:59			End date
17	**hs_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
18	**hs_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
19	**hs_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
20	**hs_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
22	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
23	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
24	**hs_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
25	**hs_pubdate**	datetime			Yes	*NULL*			the date the data become public
26	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
27	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hs_id	A	No	
CODE	BTREE	No	No	hs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K.3. hi - Hydrologic instrument

This table stores information about each individual hydrologic instrument.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**hi_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic instrument identifier
2	**hi_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic instrument code
3	**hs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic station identifier
4	**hi_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the hydrologic instrument (recorder)
5	**hi_type**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Type of the instrument

									(float, pressure transducer, bubbler, rain gauge, barometer, flow meter, pH or conductivity meter)
6	**hi_meas**	enum('A', 'V')	*utf8_unicode_ci*		Yes	*NULL*			Pressure measurement type: A=Absolute, V=Vented(gauge)
7	**hi_units**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
8	**hi_res**	float			Yes	*NULL*			Measurement resolution/precission
9	**hi_stime**	datetime			No	0000-00-00 00:00:00			Start date
10	**hi_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
11	**hi_etime**	datetime			No	9999-12-31 23:59:59			End date
12	**hi_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
13	**hi_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	**hi_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**hi_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**hi_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	**hi_pubdate**	datetime			Yes	*NULL*			the date the data become public
21	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hi_id	A	No	
CODE	BTREE	No	No	hi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	hs_id	A	Yes	

Links

Field	Link to
hs_id	hs.hs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

L. HYDROLOGIC DATA

L.1. hd - Hydrologic data

This table stores all of the water data including temperature, water depth, and concentrations. The data are collected either continuously or periodically as part of a campaign. The most common campaign data are water levels, temperature, pH, and conductance, but but chemical concentrations can also be included.

Type of compound, kation, anion or ratio could have one of the following possibilities: SO_4, H_2S for total sulfide, Cl^-, F^-, HCO_3^-, Mg, Fe, Ca, Na, K, R_2O_3, SiO_2, Free CO_2, B, As, Li, Ba, Al (in mg/L), $^3He/^4He$, $^3He/^4He$ corrected, for corrected ratio from air contamination, $\delta^{13}C$, $\delta^{34}S$, δD, $\delta^{18}O$ (in per mil).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	hd_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic data ID
2	**hd_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic data code
3	hs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic station ID
4	hi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic instrument ID
5	**hd_time**	datetime			Yes	*NULL*			Measurement time
6	**hd_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
7	**hd_temp**	float			Yes	*NULL*		°C	Water temperature
8	**hd_welev**	double			Yes	*NULL*		m	The elevation of the water level above sea level
9	**hd_wdepth**	double			Yes	*NULL*		m	Water depth below the ground surface
10	**hd_dwlev**	double			Yes	*NULL*		m	Change in water level (if the water depth and water elevation are not available)
11	**hd_bp**	float			Yes	*NULL*		mbar	Barometric pressure at the time of measurement
12	**hd_sdisc**	double			Yes	*NULL*		L/s	Spring discharge rate
13	**hd_prec**	float			Yes	*NULL*		mm	measured precipitation (daily)
14	**hd_dprec**	float			Yes	*NULL*		mm	Daily precipitation of preceeding day
15	**hd_tprec**	enum('R', 'FR', 'S', 'H', 'R-FR', 'R-S', 'R-H', 'FR-R', 'FR-S', 'FR-H', 'S-R', 'S-FR', 'S-H', 'H-R', 'H-FR', 'H-S')			Yes	*NULL*			Type of precipitation: R=Rain, FR=Freezing Rain, S=Snow, H=Hail, or any combination
16	**hd_ph**	float			Yes	*NULL*			pH of the water
17	**hd_ph_err**	float			Yes	*NULL*			pH standard error
18	**hd_cond**	float			Yes	*NULL*		µmhos/cm or µSiemens/cm	Conductivity
19	**hd_cond_err**	float			Yes	*NULL*		µmhos/cm or µSiemens/cm	Conductivity standard error
20	**hd_comp_species**	enum('SO4', 'H2S', 'Cl', 'F', 'HCO3', 'Mg', 'Fe', 'Ca', 'Na', 'K', '3He4He', 'c3He4He', 'd13C', 'd34S', 'dD', 'd18O')			Yes	*NULL*			Type of compound, kation, anion or ratio (SO_4, H_2S for total sulfide, Cl^-, F^-, HCO_3^-, Mg, Fe, Ca, Na, K, $^3He/^4He$, $^3He/^4He$ corrected, $d^{13}C$, $d^{34}S$, dD, $d^{18}O$)
21	**hd_comp_units**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		mg/L or per mil	Reported units (concentrations of common ions in

									mg/L or per mil)
22	**hd_comp_content**	float			Yes	*NULL*			Content of compound, kation, anion or ratio
23	**hd_comp_content_err**	float			Yes	*NULL*			Content of compound, kation, anion or ratio error
24	**hd_atemp**	Float			Yes	*NULL*		°C	Air temperture
25	**hd_tds**	Float			Yes	*NULL*		mg/L	Total dissolved solids (TDS)
26	**hd_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
27	**hd_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
28	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
29	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
30	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
31	**hd_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
32	**hd_pubdate**	datetime			Yes	*NULL*			the date the data become public
33	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
34	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hd_id	77137	A	No	
CODE	BTREE	No	No	hd_code	77137	A	Yes	
OWNER 1	BTREE	No	No	cc_id	1	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	77137	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	77137	A	Yes	
STATION	BTREE	No	No	hs_id	22	A	Yes	

Links

Field	Link to
hs_id	hs.hs_id
hi_id	hi.hi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M. THERMAL MONITORING SYSTEM

Thermal tables contain ground-based data collected at the thermal site or image data collected remotely. These data can be collected continuously or periodically.

M.1. cn - Common network (Thermal network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrolo-gic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_uni-code_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	cn_com	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M.2. ts - Thermal station

This table stores information such as a location, name, and a description for stations where thermal data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ts_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Thermal station ID
2	ts_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal station code
3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal network ID
4	ts_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal station or benchmark name
5	ts_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of thermal feature at the site (e.g. soil, fumarole, surface or crack in a dome, spring, crater lake, etc.) or if the station is used to collect remote image data.
6	ts_ground	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Soil or ground type
7	ts_lat	float			Yes	*NULL*		°	Latitude
8	ts_lon	float			Yes	*NULL*		°	Lontitude
9	ts_elev	float			Yes	*NULL*		m	Elevation
10	ts_perm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
11	ts_utc	float			Yes	*NULL*			Difference from UTC (- for hours before or ahead of GMT)
12	ts_stime	datetime			No	0000-00-00 00:00:00			Start date
13	ts_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
14	ts_etime	datetime			No	9999-12-31 23:59:59			End date
15	ts_etime_unc	datetime			Yes	*NULL*			End date uncertainty
16	ts_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	ts_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
18	ts_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	ts_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	ts_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ts_id	A	No	
CODE	BTREE	No	No	ts_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M.3. ti - Thermal instrument

This table was created to store information about the instruments used to collect ground-based and remote thermal data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ti_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Thermal instrument ID
2	**ti_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal instrument code
3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite identifier (for isntrument mounted on a satellite or airplane)
4	ts_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal station ID (for instruments installed at a station)
5	**ti_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of instrument
6	**ti_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, manufacturer, and model of th einstrument.
7	**ti_units**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			the units the instrument measures
8	**ti_pres**	float			Yes	*NULL*			typical instrumental measuring precission
9	**ti_stn**	float			Yes	*NULL*			Signal to noise ratio of the instrument
10	**ti_stime**	datetime			No	0000-00-00 00:00:00			Start date
11	**ti_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
12	**ti_etime**	datetime			No	9999-12-31 23:59:59			End date
13	**ti_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
14	**ti_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	**ti_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	**ti_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	**ti_pubdate**	datetime			Yes	*NULL*			the date the data become public

21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ti_id	A	No	
CODE	BTREE	No	No	ti_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ts_id	A	Yes	
SATELLITE	BTREE	No	No	cs_id	A	Yes	

Links

Field	Link to
cs_id	cs.cs_id
ts_id	ts.ts_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N. THERMAL DATA

Thermal image data can be collected from an instrument mounted to a moving object e.g. satellite or airplane (thermal image table link to cs_id) or mounted to a stationary object e.g. caldera rim, observatory roof, etc.(thermal image table link to ts_id).

N.1. td - Ground-based thermal data

This table stores all non-image of the thermal data collected on the ground. This data can be collected continuously or periodically.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	td_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Ground-based thermal data
2	td_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Ground based thermal code
3	ts_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal station ID
4	ti_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal instrument ID
5	td_mtype	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Measurement type (e.g. thermocouple, thermal IR, etc.)
6	td_time	datetime			Yes	*NULL*			Measurement time
7	td_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	td_depth	float			Yes	*NULL*		m	Depth of measurement below the ground surface (to derive geothermal gradients and/or heat flux)
9	td_distance	float			Yes	*NULL*		m	Distance from instrument to the measured object
10	td_calc_flag	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value flag: O=Original/directly measured, R=Recalculated from other parameter
11	td_temp	float			Yes	*NULL*		°C	Measured temperature
12	td_terr	float			Yes	*NULL*		°C	Temperature standard error
13	td_aarea	float			Yes	*NULL*		m^2	Approximate area of the body measured
14	td_flux	float			Yes	*NULL*		W/m^2	Heat flux
15	td_ferr	float			Yes	*NULL*		W/m^2	Heat flux standard error
16	td_bkgg	float			Yes	*NULL*		°C/km	Background geothermal gradient
17	td_tcond	float			Yes	*NULL*		$W/(m^2$ °C)	Thermal conductivity at the station/measurement point, inferred from the soil type or measured intrinsically.
18	td_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
19	td_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	td_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	td_pubdate	datetime			Yes	*NULL*			the date the data become public
25	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_pix_id	A	No	
LAT/LON	BTREE	Yes	No	td_img_id	A	Yes	
				td_pix_lat	A	Yes	
				td_pix_lon	A	Yes	

Links

Field	Link to
td_img_id	td_img.td_img_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.2. td_img - Thermal image

This table contains data collected from space, the air, or the ground that are used to create thermal images. The actual pixel-by-pixel data of the image are stored in the Thermal image data table (td_pix).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**td_img_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Thermal image ID
2	**td_img_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal image code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**cs_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
5	**ts_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal station ID
6	**ti_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal instrument ID
7	**td_img_iplat**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of instrument platform (e.g. airplane, satellite, crater rim, etc.)
8	**td_img_ialt**	float			Yes	*NULL*		m	Instrument altitude
9	**td_img_ilat**	float			Yes	*NULL*		°	Instrument latitude
10	**td_img_ilon**	float			Yes	*NULL*		°	Instrument longitude
11	**td_img_idatum**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Datum used for latitude or longitude
12	**td_img_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of the image
13	**td_img_time**	datetime			Yes	*NULL*			Time of the image was taken
14	**td_img_time_unc**	datetime			Yes	*NULL*			Time uncertainty
15	**td_img_bname**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Band name (each band separated by coma)
16	**td_img_hbwave**	float			Yes	*NULL*		µm	High band wavelength
17	**td_img_lbwave**	float			Yes	*NULL*		µm	Low band wavelength
18	**td_img_path**	blob		BINARY	Yes	*NULL*			Directory path/link where the image is stored
19	**td_img_psize**	float			Yes	*NULL*		m	Pixel size of the image
20	**td_img_maxrad**	float			Yes	*NULL*		$W/(m^2\text{-}m) \times 10^7$	Maximum radiance of any pixel in the frame
21	**td_img_maxrrad**	float			Yes	*NULL*		$W/(m^2\text{-}m \times sr) \times 10^7$	Maximum relative radiance (sr is spectral radiance, wavelength dependent)
22	**td_img_maxtemp**	float			Yes	*NULL*		°C	Temperature of the hottest pixel

23	**td_img_totrad**	float			Yes	*NULL*		W/(m^2-m) × 10^7	Total radiance in the whole surface of the frame (integration of all pixel radiances)
24	**td_img_maxflux**	float			Yes	*NULL*		W/m^2	Maximum heat flux
25	**td_img_ntres**	float			Yes	*NULL*		°C	Nominal temperature resolution (per pixel)
26	**td_img_atmcorr**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Atmospheric correction procedure/method applied
27	**td_img_thmcorr**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Thermal correction procedure/method applied using ground truth points
28	**td_img_ortho**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of orthorectification procedure used
29	**Td_img_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
30	**td_img_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
31	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
32	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
33	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
34	**td_img_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
35	**td_img_pubdate**	datetime			Yes	*NULL*			the date the data become public
36	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
37	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_img_id	A	No	
CODE	BTREE	No	No	td_img_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ts_id	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cs_id	cs.cs_id
ts_id	ts.ts_id
ti_id	ti.ti_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.3. td_pix - Thermal pixel data

This table contains data for each pixel of a thermal image.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	td_pix_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image data ID
2	td_img_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal image ID
3	td_pix_elev	float			Yes	*NULL*		m	Elevation of the pixel center
4	td_pix_lat	float			Yes	*NULL*		°	Latitude of the pixel center
5	td_pix_lon	float			Yes	*NULL*		°	Longitude of the pixel center
6	td_pix_rad	float			Yes	*NULL*		$W/(m^2-m) \times 10^7$	Pixel radiance
7	td_pix_flux	float			Yes	*NULL*		W/m^2	Pixel heat flux
8	td_pix_temp	float			Yes	*NULL*		°C	Pixel temperature
9	td_pix_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
10	td_pix_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
11	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_pix_id	A	No	
LAT/LON	BTREE	Yes	No	td_img_id	A	Yes	
				td_pix_lat	A	Yes	
				td_pix_lon	A	Yes	

Links

Field	Link to
td_img_id	td_img.td_img_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

O. METEOROLOGICAL MONITORING SYSTEM

This section of WOVOdat contains meteorological monitoring data that are collected from available meteorological station around the volcano, to support other monitoring data and possible indication of volcanic unrest.

O.1. cn - Common network (Meteo network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.2. ms - Meteo station

This table stores information such as location, and descriptions for stations where meteorological data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ms_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Meteorological station ID
2	**ms_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorological station code
3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteorology network ID
4	**ms_name**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorology station name
5	**ms_lat**	double			Yes	*NULL*		°	Latitude
6	**ms_lon**	double			Yes	*NULL*		°	Longitude
7	**ms_elev**	float			Yes	*NULL*		m	Elevation
8	**ms_perm**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
9	**ms_type**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of station (airport, local, regional, observatory, etc.)
10	**ms_stime**	datetime			No	0000-00-00 00:00:00			Start date
11	**ms_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
12	**ms_etime**	datetime			No	9999-12-31 23:59:59			End date
13	**ms_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
14	**ms_utc**	float			Yes	*NULL*			Difference from UTC
15	**ms_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
16	**ms_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**=original from observatory
17	**ms_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	**ms_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	**ms_pubdate**	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ms_id	A	No	
CODE	BTREE	No	No	ms_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

O.3. mi - Meteo instrument

This table stores information about each individual meteorological instrument. The instruments are either permanently or temporarily installed as part of a campaign.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**mi_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCRE-MENT		Meteorological instru-ment identifier
2	**mi_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorological instru-ment code
3	**ms_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Meteorological station identifier
4	**mi_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the met-eorological instrument (recorder)
5	**mi_type**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Type of the instrument (rain gauge, windvane, anemometer, barometer or air pressure sensor, thermometer, soil ther-mometer, etc.)
6	**mi_units**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
7	**mi_res**	float			Yes	*NULL*			Measurement resolu-tion/precision
8	**mi_stime**	datetime			No	0000-00-00 00:00:00			Start date
9	**mi_stime_unc**	datetime			Yes	*NULL*			Start date uncertainty
10	**mi_etime**	datetime			No	9999-12-31 23:59:59			End date
11	**mi_etime_unc**	datetime			Yes	*NULL*			End date uncertainty
12	**mi_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
13	**mi_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
14	**mi_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	**mi_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	**mi_pubdate**	datetime			Yes	*NULL*			the date the data be-

									come public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	mi_id	1	A	No	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
STATION	BTREE	No	No	ms_id		A	Yes	

Links

Field	Link to
ms_id	ms.ms_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

P. METEOROLOGICAL DATA

P.1. med - Meteo data

This table stores all of the meteo data including precipitation, wind speed, wind direction, air temperature, soil temperature, barometric pressure, and humidity. The data are collected either continuously or periodically as part of a campaign.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	med_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Meteo data ID
2	**med_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteo data code
3	ms_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteo station ID
4	mi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteo instrument ID
5	**med_time**	datetime			Yes	*NULL*			Measurement time
6	**med_time_unc**	datetime			Yes	*NULL*			Measurement time uncertainty
7	**med_temp**	float			Yes	*NULL*		°C	air temperature
8	**med_stemp**	float			Yes	*NULL*		°C	soil temperature
9	**med_bp**	float			Yes	*NULL*		mbar	Barometric pressure at the time of measurement
10	**med_prec**	float			Yes	*NULL*		mm	measured precipitation (daily)
11	**med_tprec**	enum('R', 'FR', 'S', 'H', 'R-FR', 'R-S', 'R-H', 'FR-R', 'FR-S', 'FR-H', 'S-R', 'S-FR', 'S-H', 'H-R', 'H-FR', 'H-S')			Yes	*NULL*			Type of precipitation: R=Rain, FR=Freezing Rain, S=Snow, H=Hail, or any combination
12	**med_hd**	float			Yes	*NULL*		%	humidity
13	**med_wind**	float			Yes	*NULL*		m/s	Wind speed
14	**med_wsmin**	float			Yes	*NULL*		m/s	Minimum wind speed
15	**med_wsmax**	float			Yes	*NULL*		m/s	Maximum wind speed
16	**med_wdir**	varchar(30)			Yes	*NULL*			Wind direction
17	**med_obs**	varchar(255)	*utf8_uni-*		Yes	*NULL*			Observer (person report-

			code_ci						ing)
18	**med_clc**	float			Yes	*NULL*			Cloud coverage
19	**med_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
20	**med_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	**med_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	**med_pubdate**	datetime			Yes	*NULL*			the date the data become public
25	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	med_id	A	No	
CODE	BTREE	No	No	med_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ms_id	A	Yes	

Links

Field	Link to
ms_id	ms.ms_id
mi_id	mi.mi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q. INFERRED PROCESSES

This tables were created to store historical inferences about processes causing volcanic unrest, based mostly on published references. Each of the inferred process fields should express in a one-character flag (Y for yes, N for no, M for maybe, and U for unknown or no information).

Q.1. ip_hyd - Hydrothermal system interaction

This table stores information about magmatic interactions with the hydrothermal system.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_hyd_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrothermal data ID
2	ip_hyd_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hdrothermal data code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_hyd_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_hyd_time_unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_hyd_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_hyd_start_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_hyd_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_hyd_end_unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_hyd_gwater	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Convective heating of groundwater: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_hyd_ipor	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Destabilization of edifice by pore pressure increase: Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_hyd_edef	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Elastic deformation induced by pore pressure change Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_hyd_hfrac	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Hydrofracturing: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_hyd_btrem	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Boiling induced tremor: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_hyd_abgas	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Absorption of soluble gases: Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_hyd_species	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Change in equilibrium species: Y=Yes, N=No, M=Maybe, U=Unknown
17	ip_hyd_chim	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Boiling until dry chimneys are formed: Y=Yes, N=No, M=Maybe, U=Unknown
18	ip_hyd_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
19	ip_hyd_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	ip_hyd_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)

24	**ip_hyd_pub date**	datetime			Yes	*NULL*			the date the data become public
25	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_hyd_id	A	No	
CODE	BTREE	No	No	ip_hyd_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.2. ip_mag - Magma movement

This table stores information about processes related to the movement of magma.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ip_mag_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magma movement ID
2	**ip_mag_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magma movement code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**ip_mag_time**	datetime			Yes	*NULL*			The date and time the inference was made.
5	**ip_mag_time_unc**	datetime			Yes	*NULL*			Inference time uncertainty
6	**ip_mag_start**	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	**ip_mag_start_unc**	datetime			Yes	*NULL*			Start time uncertainty
8	**ip_mag_end**	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	**ip_mag_end_unc**	datetime			Yes	*NULL*			End time uncertainty
10	**ip_mag_deepsupp**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			New or renewed supply of magma from depth: Y=Yes, N=No, M=Maybe, U=Unknown
11	**ip_mag_asc**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma ascent, up from reservoir: Y=Yes, N=No, M=Maybe, U=Unknown
12	**ip_mag_convb**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma conection/overturn induced from below by an intrusion at the base: Y=Yes, N=No, M=Maybe, U=Unknown

13	**ip_mag_conva**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma convection/overturn induced from above, by settling of a dense crystal-rich mass: Y=Yes, N=No, M=Maybe, U=Unknown
14	**ip_mag_mix**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma mixing: Y=Yes, N=No, M=Maybe, U=Unknown
15	**ip_mag_dike**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Dike intrusion: Y=Yes, N=No, M=Maybe, U=Unknown
16	**ip_mag_pipe**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Intrusion through a pipe-like cylindrical conduit: Y=Yes, N=No, M=Maybe, U=Unknown
17	**ip_mag_sill**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Sill intrusion: Y=Yes, N=No, M=Maybe, U=Unknown
18	**ip_mag_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
19	**ip_mag_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	**ip_mag_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	**ip_mag_pubdate**	datetime			Yes	*NULL*			the date the data become public
25	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_mag_id	A	No	
CODE	BTREE	No	No	ip_mag_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.3. ip_pres - Buildup of magma pressure

This table stores information about processes related to an increase in magmatic pressure.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ip_pres_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magma pressure ID

2	**ip_pres_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magma pressure code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**ip_pres_time**	datetime			Yes	*NULL*			The date and time the inference was made.
5	**ip_pres_time_unc**	datetime			Yes	*NULL*			Inference time uncertainty
6	**ip_pres_start**	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	**ip_pres_start_unc**	datetime			Yes	*NULL*			Start time uncertainty
8	**ip_pres_end**	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	**ip_pres_end_unc**	datetime			Yes	*NULL*			End time uncertainty
10	**ip_pres_gas**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Gas-induced overpressure: Y=Yes, N=No, M=Maybe, U=Unknown
11	**ip_pres_tec**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma or tectonically induced overpressure: Y=Yes, N=No, M=Maybe, U=Unknown
12	**ip_pres_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
13	**ip_pres_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
15	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	**ip_pres_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	**ip_pres_pubdate**	datetime			Yes	*NULL*			the date the data become public
19	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_pres_id	A	No	
CODE	BTREE	No	No	ip_pres_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.4. ip_sat - Volatile saturation

This table stores information about processes related to volatiles in the magma.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_sat_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volatile saturation ID
2	ip_sat_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_sat_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_sat_time_unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_sat_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_sat_start_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_sat_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_sat_end_unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_sat_co2	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma became saturated with CO2 before an eruption and contributed to preeruption unrest: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_sat_h2o	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma became saturated with H2O before an eruption: Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_sat_decomp	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by decompression: Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_sat_dfo2	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by a change in f)2 Fugacity: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_sat_add	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by volatile addition: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_sat_xtl	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by Crystallization or second boiling: Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_sat_ves	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Subsurface, preeruptive increases in vesiculation, thereby decreasing density. Y=Yes, N=No, M=Maybe, U=Unknown
17	ip_sat_devels	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Subsurface, preeruptive decrease in vesiculation, thereby increasing density: Y=Yes, N=No, M=Maybe, U=Unknown
18	ip_sat_degas	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Deep and near-surface degassing include gas explosion events: Y=Yes, N=No, M=Maybe, U=Unknown
19	ip_sat_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
20	ip_sat_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
22	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
23	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
24	ip_sat_load-	datetime			Yes	*NULL*			the date the data was entered

	date								(in UTC)
25	**ip_sat_pub-date**	datetime			Yes	*NULL*			the date the data become public
26	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
27	**cb_ids**	varchar(255)	*utf8_uni-code_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_sat_id	0	A	No	
CODE	BTREE	No	No	ip_sat_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
VOLCANO	BTREE	No	No	vd_id		A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.5. ip_tec - Regional tectonics interaction

This table stores information about processes related to regional tectonic events.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**ip_tec_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCRE-MENT		Reginal tectonic ID
2	**ip_tec_code**	varchar(30)	*utf8_uni-code_ci*		Yes	*NULL*			Regional tectonic code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**ip_tec_time**	datetime			Yes	*NULL*			The date and time the inference was made.
5	**ip_tec_time _unc**	datetime			Yes	*NULL*			Inference time uncertainty
6	**ip_tec_start**	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	**ip_tec_start _unc**	datetime			Yes	*NULL*			Start time uncertainty
8	**ip_tec_end**	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	**ip_tec_end_ unc**	datetime			Yes	*NULL*			End time uncertainty
10	**ip_tec_chan ge**	enum('Y', 'N', 'M', 'U')	*utf8_uni-code_ci*		Yes	*NULL*			Tectonically induced changes in magma/hydrothermal system: Y=Yes, N=No, M=Maybe, U=Unknown
11	**ip_tec_sstre ss**	enum('Y', 'N', 'M', 'U')	*utf8_uni-code_ci*		Yes	*NULL*			Changes in static stress after large regional earthquake (in-clude viscoelastic process): Y=Yes, N=No, M=Maybe, U=Unknown
12	**ip_tec_dstr**	enum('Y', 'N',	*utf8_uni-*		Yes	*NULL*			Dynamic strain, associated with

	ain	'M', 'U')	*code_ci*						passage of earthquake waves from distal source: Y=Yes, N=No, M=Maybe, U=Unknown
13	**ip_tec_fault**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Local fault shear or other deformation of the cone: Y=Yes, N=No, M=Maybe, U=Unknown
14	**ip_tec_seq**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Slow earthquake, as recorded by GPS or strain: Y=Yes, N=No, M=Maybe, U=Unknown
15	**ip_tec_press**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Pressurization of magma or hydrothermal reservoir located several km (include Distal VT earthquake): Y=Yes, N=No, M=Maybe, U=Unknown
16	**ip_tec_depress**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Depressurization of magma or hydrothermal reservoir located several km or more(include distal VT): Y=Yes, N=No, M=Maybe, U=Unknown
17	**ip_tec_hp-press**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Increase hydrothermal pore pressurs(lubrication) along faults beneath or near the volcano: Y=Yes, N=No, M=Maybe, U=Unknown
18	**ip_tec_etide**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Earth-tide interaction with magma/hydrothermal systems: Y=Yes, N=No, M=Maybe, U=Unknown
19	**ip_tec_atmp**	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Interaction of th evolcanic system with changes in atmospheric pressure, rainfall, wind, etc.: Y=Yes, N=No, M=Maybe, U=Unknown
20	**ip_tec_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
21	**ip_tec_com**	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
22	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
23	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
24	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
25	**ip_tec_load-date**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	**ip_tec_pub-date**	datetime			Yes	*NULL*			the date the data become public
27	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
28	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_tec_id	A	No	
CODE	BTREE	No	No	ip_tec_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R. Common or Shared

The common or shared tables store data from within the Volcano > Network > Station > Instrument hierarchy that are used by almost all of the monitoring tables.

R.1. cc - Contact

This table provides all of the contact information for a person, observatory, or institution.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cc_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Contact ID
2	**cc_code**	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*			Contact Code
3	**cc_code2**	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*			Contact Code alias
4	**cc_fname**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			First name
5	**cc_lname**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Last name
6	**cc_obs**	varchar(150)	*utf8_unicode_ci*		Yes	*NULL*			Observatory
7	**cc_add1**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Address 1
8	**cc_add2**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Address 2
9	**cc_city**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			City
10	**cc_state**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			State
11	**cc_country**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Country
12	**cc_post**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Postal code
13	**cc_url**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Web address
14	**cc_email**	varchar(320)	*utf8_unicode_ci*		Yes	*NULL*			Email
15	**cc_phone**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Phone
16	**cc_phone2**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Phone 2
17	**cc_fax**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Fax
18	**cc_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	**cc_loaddate**	datetime			Yes	*NULL*			the date the data was entered

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cc_id	A	No	
CODE	BTREE	Yes	No	cc_code	A	Yes	
CODE2	BTREE	Yes	No	cc_code2	A	Yes	

R.2. cb - Bibliographic

This table stores information about articles, papers, books, and web sites, with information that is related to the data in WOVOdat.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cb_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Bibliographic ID
2	**cb_auth**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Authors/Editors
3	**cb_year**	year(4)			Yes	*NULL*			Publication year
4	**cb_title**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Title
5	**cb_journ**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Journal
6	**cb_vol**	varchar(20)	*utf8_unicode_ci*		Yes	*NULL*			Volume
7	**cb_pub**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Publisher

8	**cb_page**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Pages
9	**cb_doi**	varchar(20)	*utf8_unicode_ci*		Yes	*NULL*			Digital Object Identifier
10	**cb_isbn**	varchar(13)	*utf8_unicode_ci*		Yes	*NULL*			International Standard Book Number
11	**cb_url**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Info on the web
12	**cb_labadr**	varchar(320)	*utf8_unicode_ci*		Yes	*NULL*			Email address of observatory
13	**cb_keywords**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Keywords
14	**cb_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	**cb_loaddate**	datetime			Yes	*NULL*			the date the data was entered
16	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cb_id	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

R.3. co - Observation

This table provides storage for observations about volcanic activity.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**co_id**	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Observation ID
2	**co_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Observation Code
3	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	**co_observe**	text	*utf8_unicode_ci*		Yes	*NULL*			Description
5	**co_stime**	datetime			Yes	*NULL*			Start time
6	**co_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**co_etime**	datetime			Yes	*NULL*			End time
8	**co_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
9	**co_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
10	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
11	**cc_id2**	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
12	**cc_id3**	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
13	**co_loaddate**	datetime			Yes	*NULL*			the date the data was entered
14	**co_pubdate**	datetime			Yes	*NULL*			the date the data become public
15	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
16	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment

PRIMARY	BTREE	Yes	No	co_id	A	No	
CODE	BTREE	No	No	co_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.4. cm - Image

This table stores images that support other WOVOdat data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cm_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image ID
2	cm_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Image Code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	cm_lat	double			Yes	*NULL*			Latitude
5	cm_lon	double			Yes	*NULL*			Longitude
6	cm_location	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location
7	cm_description	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description (including the scale)
8	cm_format	varchar(10)	*utf8_unicode_ci*		Yes	*NULL*			Image format
9	cm_date	datetime			Yes	*NULL*			Date
10	cm_date_unc	datetime			Yes	*NULL*			Date uncertainty
11	cm_image	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link/path where the image store
12	cm_usage	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Usage of image (copyright)
13	cm_keywords	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Keywords (for searches)
14	cm_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
15	cm_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cm_loaddate	datetime			Yes	*NULL*			the date the data was entered
20	cm_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cm_id	A	No	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
CODE	BTREE	No	No	cm_code	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.5. md - Map

This table stores information about maps that cover areas where WOVOdat data is collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**md_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Map ID
2	**md_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Map Code
3	**vd_id**	mediumint(8)			Yes	*NULL*			Volcano ID
4	**md_name**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Map Name
5	**md_type**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Map Type (topo, DEM, etc.)
6	**md_srtm**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to DEM stored on the WOVOdat server.
7	**md_scale**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Scale of the map
8	**md_contour**	float			Yes	*NULL*		m	Contour interval
9	**md_date**	date			Yes	*NULL*			Publication date
10	**md_date_unc**	date			Yes	*NULL*			Publication date uncertainty
11	**md_proj**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Projection
12	**mp_map_datum**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Datum
13	**md_west**	float			Yes	*NULL*		°	West bounding coordinate
14	**md_east**	float			Yes	*NULL*		°	East bounding coordinate
15	**md_north**	float			Yes	*NULL*		°	North bounding coordinate
16	**md_south**	float			Yes	*NULL*		°	South bounding coordinate
17	**md_elev_max**	float			Yes	*NULL*		m	Maximum elevation
18	**md_elev_min**	float			Yes	*NULL*		m	Minimum elevation
19	**md_use**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Intended use of the map
20	**md_restric-tions**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Restrictions on the use
21	**md_quality**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Quality of the map
22	**md_image**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to image
23	**md_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
24	**md_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
25	**md_com**	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
26	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID

27	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
28	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
29	**md_loaddate**	datetime			Yes	*NULL*			the date the data was entered
30	**md_pubdate**	datetime			Yes	*NULL*			the date the data become public
31	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
32	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to biblio-graphy table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	med_id	A	No	
CODE	BTREE	No	No	med_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ms_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.6. cs - Satellite/Airplane

This table stores information about satellites and airplanes that are used for collecting data from above the surface of the earth.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cs_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCRE-MENT		Satellite/airplane ID
2	**cs_code**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Satellite/airplane code
3	**cs_type**	enum('S', 'A')	*utf8_unicode_ci*		Yes	*NULL*			Type (A=Airplane, S=Satellite)
4	**cs_name**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Satellite/airplane name
5	**cs_stime**	datetime			No	0000-00-00 00:00:00			Start time
6	**cs_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
7	**cs_etime**	datetime			No	9999-12-31 23:59:59			End time
8	**cs_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
9	**cs_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
10	**cs_ori**	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. **D**=digitized, **O**= original from observatory
11	**cs_com**	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
12	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
13	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
14	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
15	**cs_loaddate**	datetime			Yes	*NULL*			the date the data was entered

16	**cs_pubdate**	datetime			Yes	*NULL*			the date the data become public
17	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cb_id	56	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.7. st_eqt – Earthquake translation

The Earthquake Translation table (st_eqt, for Seismic Translation - Earthquake Types) allows users to translate an earthquake type defined by one observatory to the WOVOdat earthquake type. Some observatories refer to different earthquake types by the same name or similar earthquake types by different names.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**st_eqt_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Earthquake translation identifier
2	**st_eqt_wovo**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			WOVOdat terminology
3	**st_eqt_org**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Original terminology used by the observatory
3	**st_eqt_name**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Earthquake name
4	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Owner identifier
5	**st_eqt_loaddate**	datetime	*utf8_unicode_ci*		Yes	*NULL*			the date the data was entered (in UTC)
6	**cc_id_load**	smallint(5)	*utf8_unicode_ci*	UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	st_eqt_id	A	No	
USER TRANSLATION	BTREE	Yes	No	st_eqt_wovo	A	Yes	
				cc_id	A	Yes	

Links

Field	Link to
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

S. SYSTEM

S.1. jj_concon - User to user permissions

This table stores information about the permissions (upload, update, view their data or manage their account) given by a user to another.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_concon_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		User to user permission ID
2	cc_id	smallint(5)		UNSIGNED	No	*None*			Granting user ID (granter)
3	cc_id_granted	smallint(5)		UNSIGNED	No	*None*			Granted user ID
4	jj_concon_view	tinyint(1)			No	0			Permission to view unpublished data: 0=No, 1=Yes
5	jj_concon_upload	tinyint(1)			No	0			Permission to upload data: 0=No, 1=Yes
6	jj_concon_update	tinyint(1)			No	0			Permission to update data: 0=No, 1=Yes
7	jj_concon_admin	tinyint(1)			No	0			Permission to manage account: 0=No, 1=Yes
8	jj_concon_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
9	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_concon_id	A	No	
GRANT	BTREE	Yes	No	cc_id	A	No	
				cc_id_granted	A	No	

Links

Field	Link to
cc_id	cc.cc_id
cc_id_granted	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

S.2. jj_imgx - Image junction

This table was created to link images to other known data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_imgx_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image junction ID
2	cm_id	smallint(5)		UNSIGNED	No	*None*			Image ID
3	jj_idname	enum('cb', 'cc', 'ch', 'cm', 'cn', 'co', 'cp', 'cr', 'cr_tmp', 'cs', 'cu', 'dd_ang', 'dd_edm', 'dd_gps', 'dd_gpv', 'dd_lev', 'dd_sar', 'dd_srd', 'dd_str', 'dd_tlt', 'dd_tlv', 'di_gen', 'di_tlt', 'ds', 'ed', 'ed_for', 'ed_phs', 'ed_vid', 'fd_ele', 'fd_gra', 'fd_mag', 'fd_mgv', 'fi', 'fs', 'gd', 'gd_plu', 'gd_sol', 'gi', 'gs', 'hd', 'hi', 'hs', 'ip_hyd', 'ip_mag',			Yes	*NULL*			The name of the other table of interest

		'ip_pres', 'ip_sat', 'ip_tec', 'jj_concon', 'jj_imgx', 'jj_volcon', 'jj_volnet', 'j_sarsat', 'md', 'sd_evn', 'sd_evs', 'sd_int', 'sd_ivl', 'sd_rsm', 'sd_sam', 'sd_ssm', 'sd_trm', 'sd_wav', 'si', 'si_cmp', 'sn', 'ss', 'st_eqt', 'td', 'td_img', 'td_pix', 'ti', 'ts', 'vd', 'vd_inf', 'vd_mag', 'vd_tec')							
4	jj_x_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Linking table ID
5	**jj_imgx_load date**	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_imgx_id	A	No	
LINK	BTREE	Yes	No	cm_id	A	No	
				jj_idname	A	Yes	
				jj_x_id	A	Yes	

Links

Field	Link to
cm_id	cm.cm_id
jj_x_id	*jj_idname.jj_idname*_id
cc_id_load	cc.cc_id

S.3. jj_volcon - Volcano-contact junction

This table was created for the many-to-many relationship between the volcano and the observatories that monitor the volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_volcon_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano-contact junction ID
2	vd_id	mediumint(8)		UNSIGNED	No	*None*			Volcano ID
3	cc_id	smallint(5)			Yes	*NULL*			User/Owner ID
4	**jj_volcon_loaddate**	datetime		UNSIGNED	Yes	*NULL*			the date the data was entered
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_volcon_id	A	No	
LINK	BTREE	Yes	No	vd_id	A	No	
				cc_id	A	No	

Links

Field	Link to

vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id

S.4. jj_volnet - Volcano-network junction

This table was created for the many-to-many relationship between the volcano and the observatories that monitor the volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_volnet_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano-network junction ID
2	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
3	jj_net_id	smallint(5)		UNSIGNED	Yes	*NULL*			Network ID
4	jj_net_flag	enum('C', 'S')	*utf8_unicode_ci*		Yes	*NULL*			Network type: C=Common, S=Seismic
5	jj_volnet_loaddate	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_volnet_id	A	No	
LINK	BTREE	Yes	No	vd_id	A	Yes	
				jj_net_id	A	Yes	
				jj_net_flag	A	Yes	
jj_volnet_id	BTREE	No	No	jj_volnet_id	A	No	
jj_volnet_id_2	BTREE	No	No	jj_volnet_id	A	No	

Links

Field	Link to
vd_id	vd.vd_id
jj_net_id	*jj_net_flag*n.*jj_net_flag*n_id
cc_id_load	cc.cc_id

S.5. j_sarsat - InSAR-satellite junction

This table was created for the many-to-many relationship between the satellite data and the InSAR data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	j_sarsat_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR-satellite junction ID
2	dd_sar_id	mediumint(8)		UNSIGNED	Yes	*NULL*			InSAR image ID
3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
4	j_sarsat_loaddate	datetime			Yes	*NULL*			the date the data was entered
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	j_sarsat_id	A	No	
LINK	BTREE	Yes	No	dd_sar_id	A	Yes	

				cs_id	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cs_id	cs.cs_id
cc_id_load	cc.cc_id

S.6. cr - Registry

This table provides username and password information for people who registered to WOVOdat.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cr_id	tinyint(3)		UNSIGNED	No	*None*	AUTO_INCREMENT		Registry ID
2	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			User ID
3	**cr_uname**	varchar(30)	*utf8_unicode_ci*		No	*None*			Username for login
4	**cr_pwd**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Password for login
5	**cr_regdate**	datetime			Yes	*NULL*			Registration date
6	**cr_update**	datetime			Yes	*NULL*			Last update

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cr_id	A	No	
USERNAME	BTREE	Yes	No	cr_uname	A	No	
CONTACT	BTREE	Yes	No	cc_id	A	Yes	

Links

Field	Link to
cc_id_load	cc.cc_id

S.7. cr_tmp - Temporary registry

This table stores information about users who wish to register to WOVOdat while waiting for them to confirm registration by clicking the link provided in a confirmation email.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cr_tmp_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Temporary registry ID
2	**cr_tmp_time**	datetime			No	*None*			Time when the registry made
3	**cr_tmp_email**	varchar(320)	*utf8_unicode_ci*		No	*None*			Email
4	**cr_tmp_fname**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			First name
5	**cr_tmp_lname**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Last name
6	**cr_tmp_obs**	varchar(150)	*utf8_unicode_ci*		Yes	*NULL*			Observatory
7	**cr_tmp_add1**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Address 1
8	**cr_tmp_add2**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Address 2
9	**cr_tmp_city**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			City
10	**cr_tmp_state**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			State/Province
11	**cr_tmp_country**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Country
12	**cr_tmp_post**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Postal code
13	**cr_tmp_url**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Web address
14	**cr_tmp_phone**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Phone
15	**cr_tmp_phone2**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Phone 2
16	**cr_tmp_fax**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Fax
17	**cr_tmp_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	**cr_tmp_uname**	varchar(30)	*utf8_unicode_ci*		No	*None*			Username
19	**cr_tmp_pwd**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Password

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cr_tmp_id	A	No	
USERNAME	BTREE	Yes	No	cr_tmp_uname	A	No	

S.8. cp - Permission

This table provides the access information for each registered user.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
	cp_id	tinyint(3)		UNSIGNED	No	*None*	AUTO_INCREMENT		Permission ID
2	cr_id	tinyint(3)		UNSIGNED	Yes	*NULL*			Registry ID
3	**cp_access**	enum('0','1','2','3','4','5','6','7','8','9')			No	9			Access level: 0=Developer, 9=Minimum access
4	**cp_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cp_id	A	No	
REGISTERED USER	BTREE	Yes	No	cr_id	A	Yes	

Links

Field	Link to
cr_id	cr.cr_id
cc_id_load	cc.cc_id

S.9. cu - Upload history

This table stores information about all uploads made to the database, including those which failed.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cu_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Upload history ID
2	**cu_file**	varchar(255)	*utf8_unicode_ci*		No	*None*			Original uploaded file name
3	**cu_type**	enum('P', 'PE', 'TBP', 'T', 'TE', 'TBT', 'U', 'O')	*utf8_unicode_ci*		Yes	*NULL*			Type of upload: I=In database, N=Not in database (test), U=Undone, T=Temporary (to be treated later), W=translated to WOVOML , F=Failed
4	**cu_com**	text	*utf8_unicode_ci*		Yes	*NULL*			Comments or error message
5	**cu_loaddate**	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cu_id	19951	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

S.10. ch - Change

This table stores information about any changes that have been made in the database.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ch_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Change ID
2	**ch_linkname**	enum('cb', 'cc', 'ch', 'cm', 'cn', 'co', 'cp', 'cr', 'cr_tmp', 'cs', 'cu', 'dd_ang', 'dd_edm', 'dd_gps', 'dd_gpv', 'dd_lev', 'dd_sar', 'dd_srd', 'dd_str', 'dd_tlt', 'dd_tlv', 'di_gen', 'di_tlt', 'ds', 'ed', 'ed_for', 'ed_phs', 'ed_vid', 'fd_ele', 'fd_gra', 'fd_mag', 'fd_mgv', 'fi', 'fs', 'gd', 'gd_plu', 'gd_sol', 'gi', 'gs', 'hd', 'hi', 'hs', 'ip_hyd', 'ip_mag', 'ip_pres', 'ip_sat', 'ip_tec', 'jj_concon', 'jj_imgx', 'jj_volcon', 'jj_volnet', 'j_sarsat', 'md', 'sd_evn', 'sd_evs', 'sd_int', 'sd_ivl', 'sd_rsm', 'sd_sam', 'sd_ssm', 'sd_trm', 'sd_wav', 'si', 'si_cmp', 'sn', 'ss', 'st_eqt', 'td', 'td_img', 'td_pix', 'ti', 'ts', 'vd', 'vd_inf', 'vd_mag', 'vd_tec')			Yes	*NULL*			The name of the table where the change has been made.
3	ch_link_id	mediumint(8)		UNSIGNED	Yes	*NULL*			The ID-number of the set of data where the change has been made.
4	**ch_atname**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Field/attribute name where the change has been made
5	**ch_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
6	**ch_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
7	**ch_loaddate**	datetime			Yes	*NULL*			the date the data was entered
8	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ch_id	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

NOTE

1. element of the table that highlighted by light-gray shade: filled automatically by the system when the data uploaded
2. element written in "**red**": link to other table
3. Standard datetime format: YYYY-MM-DD HH:MM:SS.SS (in UTC)
4. Standard origin time format: YYYY-MM-DD HH:MM:SS (in UTC)

Appendix-1 WOVOdat XML-format

WOVOdat XML template

Class, attributes, and elements

```
<?xml version="1.0" encoding="UTF-8"?>
<wovoml owner1="…" owner2="…" owner3="…" pubDate="…" v="…" version="…" xmlns="http://www.wovodat.org"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.wovodat.org wovoml_schema.xsd ">
        <Observations>...</Observations>
        <InferredProcesses>...</InferredProcesses>
        <Eruptions>...</Eruptions>
        <MonitoringSystems>...</MonitoringSystems>
        <Data>...</Data>
</wovoml>
```

Observations: This class contains information for observations about volcanic activity.

```
<?xml version="1.0" encoding="UTF-8"?>
<wovoml owner1="…" owner2="…" owner3="…" pubDate="…" v="…" version="…" xmlns="http://www.wovodat.org"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.wovodat.org
wovoml_schema.xsd ">

  <Observations owner1="…" owner2="…" owner3="…" pubDate="…" v="…">
      <Observation code="…" owner1="…" owner2="…" owner3="…" pubDate="…" v="…">
          <description>description</description>
          <startTime>YYYY-MM-DD HH:MM:SS</startTime>
          <startTimeUnc>startTimeUnc</startTimeUnc>
          <endTime>endTime</endTime>
          <endTimeUnc>endTimeUnc</endTimeUnc>
      </Observation>
  </Observations>
```

Inferred Processes: **This class contains information about historical (in most cases, published) inferences about processes causing volcanic unrest.**

```
<InferredProcesses owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
    <MagmaMovement code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..."volcano="...">
        ...
    </MagmaMovement>
    <VolatileSat code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        ...
    </VolatileSat>
    <MagmaPressure code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        ...
    </MagmaPressure>
    <Hydrothermal code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        ...
    </Hydrothermal>
    <RegionalTectonics code="..." owner1="..." owner2="..." owner3="..." pubDate="..."v="..."volcano="...">
        ...
    </RegionalTectonics>
</InferredProcesses>
```

Eruption: **This class contains information about volcano eruption.**

```
<Eruptions owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
    <Eruption code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
        ...
        <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </Video>
        <Phase code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Video>
            <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Forecast>
        </Phase>
    </Eruption>
    <Phases eruption="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Phase code="..." eruption="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Video>
            <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Forecast>
        </Phase>
    </Phases>
    <Video code="..." eruption="..." owner1="..." owner2="..." owner3="..." phase="..." pubDate="..."  v="..." volcano="...">
        ...
    </Video>
    <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
        ...
    </Forecast>
</Eruptions>
```

Monitoring system: **This class contains information about all monitoring systems (network, stations, instruments, components) in a volcano.**

```
<MonitoringSystems owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
    <Airplane code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        ...
        <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </GasInstrument>
        <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </ThermalInstrument>
    </Airplane>
```

```
    <DeformationNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
            <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <DeformationStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </DeformationInstrument>
            <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </TiltStrainInstrument>
        </DeformationStation>
    </DeformationNetwork>
    <DeformationStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <DeformationStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </DeformationInstrument>
            <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </TiltStrainInstrument>
        </DeformationStation>
    </DeformationStations>
    <DeformationInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </DeformationInstrument>
        <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </TiltStrainInstrument>
    </DeformationInstruments>
```

```
<GasNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <GasStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </GasInstrument>
        </GasStation>
</GasNetwork>
<GasStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <GasStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </GasInstrument>
        </GasStation>
</GasStations>
<GasInstruments airplane="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <GasInstrument airplane="..." code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </GasInstrument>
</GasInstruments>
```

```
<FieldsNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <FieldsStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </FieldsInstrument>
        </FieldsStation>
</FieldsNetwork>
<FieldsStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <FieldsStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </FieldsInstrument>
        </FieldsStation>
</FieldsStations>
<FieldsInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </FieldsInstrument>
</FieldsInstruments>
```

```
<ThermalNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <ThermalStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </ThermalInstrument>
        </ThermalStation>
</ThermalNetwork>
<ThermalStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <ThermalStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </ThermalInstrument>
        </ThermalStation>
</ThermalStations>
<ThermalInstruments airplane="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <ThermalInstrument airplane="..." code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </ThermalInstrument>
</ThermalInstruments>

<SeismicNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <SeismicStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                        <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                                ...
                        </SeismicComponent>
                </SeismicInstrument>
        </SeismicStation>
</SeismicNetwork>
<SeismicStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <SeismicStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                        <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                                ...
                        </SeismicComponent>
                </SeismicInstrument>
        </SeismicStation>
</SeismicStations>
<SeismicInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
                <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </SeismicComponent>
        </SeismicInstrument>
</SeismicInstruments>
<SeismicComponents instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <SeismicComponent code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
        </SeismicComponent>
</SeismicComponents>

</MonitoringSystems>
```

Data: This class contains information about all type of volcano monitoring data obtained/recorded by "Monitoring system".

```
<Data>
    <Deformation owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <ElectronicTiltDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <ElectronicTilt code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </ElectronicTilt>
        </ElectronicTiltDataset>
        <TiltVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <TiltVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </TiltVector>
        </TiltVectorDataset>
        <StrainDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <Strain code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </Strain>
        </StrainDataset>
        <EDMDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation="..." v="...">
            <EDM code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation="..." v="...">
                ...
            </EDM>
        </EDMDataset>
        <AngleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation1="..." targetStation2="..." v="...">
            <Angle code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation1="..." targetStation2="..." v="...">
                ...
            </Angle>
        </AngleDataset>
        <GPSDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." station="..." v="...">
            <GPS code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." station="..." v="...">
                ...
            </GPS>
        </GPSDataset>
        <GPSVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <GPSVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </GPSVector>
        </GPSVectorDataset>
        <LevelingDataset firstBMStation="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." secondBMStation="..." v="...">
            <Leveling code="..." firstBMStation="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." secondBMStation="..." v="...">
                ...
            </Leveling>
        </LevelingDataset>
        <InSARImageDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..."  v="..." volcano="...">
            <InSARImage code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..."  v="..." volcano="...">
                <Satellites>
                    <satelliteCode>satelliteCode</satelliteCode>
                </Satellites>
                ...
                <InSARPixels>
                    <InSARPixel number="0">
                    <rangeOfChange>0.0</rangeOfChange>
                    </InSARPixel>
                </InSARPixels>
            </InSARImage>
        </InSARImageDataset>
    </Deformation>

    <Hydrologic owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <HydrologicSampleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <HydrologicSample code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                <HydrologicSpecies type="SO4">
                    ...
                </HydrologicSpecies>
                ...
            </HydrologicSample>
        </HydrologicSampleDataset>
    </Hydrologic>
```

```
<Gas owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
    <GasSampleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <GasSample code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <GasSpecies type="CO2" waterFree="Y">
                ...
            </GasSpecies>
            ...
        </GasSample>
    </GasSampleDataset>
    <SoilEffluxDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <SoilEfflux code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </SoilEfflux>
    </SoilEffluxDataset>
    <PlumeDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..."  v="..." volcano="...">
        <Plume code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..."  v="..." volcano="...">
            <PlumeSpecies type="CO2">
                ...
            </PlumeSpecies>
            ...
        </Plume>
    </PlumeDataset>
</Gas>
```

```
<Fields>
    <MagneticDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." station="..." v="...">
        <Magnetic code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." station="..." v="...">
            ...
        </Magnetic>
    </MagneticDataset>
    <MagneticVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <MagneticVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </MagneticVector>
    </MagneticVectorDataset>
    <ElectricDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
        <Electric code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
            ...
        </Electric>
    </ElectricDataset>
    <GravityDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
        <Gravity code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." station="..." v="...">
            ...
        </Gravity>
    </GravityDataset>
</Fields>
```

```
<Thermal>
    <Ground-basedDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <Ground-based code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </Ground-based>
    </Ground-basedDataset>
    <ThermalImageDataset airplane="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." satellite="..." station="..." v="..." volcano="...">
        <ThermalImage code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." satellite="..." station="..." v="..." volcano="...">
            ...
            <ThermalPixels>
                <ThermalPixel>
                    ...
                </ThermalPixel>
            </ThermalPixels>
        </ThermalImage>
    </ThermalImageDataset>
</Thermal>

<Seismic>
    <NetworkEventDataset network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <NetworkEvent code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </NetworkEvent>
    </NetworkEventDataset>
    <SingleStationEventDataset owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <SingleStationEvent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </SingleStationEvent>
    </SingleStationEventDataset>
    <IntensityDataset networkEvent="..." owner1="..." owner2="..." owner3="..." pubDate="..." singleStationEvent="..." v="..." volcano="...">
        <Intensity code="..." networkEvent="..." owner1="..." owner2="..." owner3="..." pubDate="..." singleStationEvent="..." v="..." volcano="...">
            ...
        </Intensity>
    </IntensityDataset>
    <TremorDataset network="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <Tremor code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </Tremor>
    </TremorDataset>
    <IntervalDataset network="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <Interval code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </Interval>
    </IntervalDataset>
    <RSAM-SSAMDataset owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <RSAM-SSAM code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
            <RSAM>
                <RSAMData>
                    ...
                </RSAMData>
            </RSAM>
            <SSAM>
                <SSAMData>
                    ...
                </SSAMData>
            </SSAM>
        </RSAM-SSAM>
    </RSAM-SSAMDataset>
</Seismic>
</Data>
```

</wovoml>

WOVOdat XML-format (version: September 2014)

```
<?xml version="1.0" encoding="UTF-8"?>
<wovoml owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" version="" xmlns="http://www.wovodat.org"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.wovodat.org WOVOML_schema.xsd ">
 <Observations owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
  <Observation code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
   <description>description</description>
   <startTime>YYYY-MM-DD HH:MM:SS</startTime>
   <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
   <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
   <comments>comments</comments>
  </Observation>
 </Observations>
 <InferredProcesses owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
  <MagmaMovement code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
   <inferTime>YYYY-MM-DD HH:MM:SS</inferTime>
   <inferTimeUnc>YYYY-MM-DD HH:MM:SS</inferTimeUnc>
   <startTime>YYYY-MM-DD HH:MM:SS</startTime>
   <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
   <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
   <deepSupp>Y</deepSupp>
   <ascent>Y</ascent>
   <convecBelow>Y</convecBelow>
   <convecAbove>Y</convecAbove>
   <magmaMix>Y</magmaMix>
   <dikeIntru>Y</dikeIntru>
   <pipeIntru>Y</pipeIntru>
   <sillIntru>Y</sillIntru>
   <orgDigitize>D</orgDigitize>
   <comments>comments</comments>
  </MagmaMovement>
  <VolatileSat code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
   <inferTime>YYYY-MM-DD HH:MM:SS</inferTime>
   <inferTimeUnc>YYYY-MM-DD HH:MM:SS</inferTimeUnc>
   <startTime>YYYY-MM-DD HH:MM:SS</startTime>
   <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
   <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
   <CO2Sat>Y</CO2Sat>
   <H2OSat>Y</H2OSat>
   <decompress>Y</decompress>
   <fugacity>Y</fugacity>
   <volatileAdd>Y</volatileAdd>
   <crystalOr2ndBoil>Y</crystalOr2ndBoil>
   <vesicul>Y</vesicul>
   <devesicul>Y</devesicul>
   <degas>Y</degas>
   <orgDigitize>D</orgDigitize>
   <comments>comments</comments>
  </VolatileSat>
  <MagmaPressure code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
   <inferTime>YYYY-MM-DD HH:MM:SS</inferTime>
   <inferTimeUnc>YYYY-MM-DD HH:MM:SS</inferTimeUnc>
   <startTime>YYYY-MM-DD HH:MM:SS</startTime>
   <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
   <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
   <gasInduced>Y</gasInduced>
```

```
    <tectInduced>Y</tectInduced>
    <orgDigitize>D</orgDigitize>
    <comments>comments</comments>
  </MagmaPressure>
  <Hydrothermal code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
    <inferTime>YYYY-MM-DD HH:MM:SS</inferTime>
    <inferTimeUnc>YYYY-MM-DD HH:MM:SS</inferTimeUnc>
    <startTime>YYYY-MM-DD HH:MM:SS</startTime>
    <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
    <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
    <heatGwater>Y</heatGwater>
    <poreDestab>Y</poreDestab>
    <poreDeform>Y</poreDeform>
    <hydrofract>Y</hydrofract>
    <boilTremor>Y</boilTremor>
    <absorSolGas>Y</absorSolGas>
    <speciesEqbChange>Y</speciesEqbChange>
    <boilDryChimneys>Y</boilDryChimneys>
    <orgDigitize>D</orgDigitize>
    <comments>comments</comments>
  </Hydrothermal>
  <RegionalTectonics code="" owner1="" owner2="" owner3="" pubDate="YYYY-MM-DD HH:MM:SS" volcano="">
    <inferTime>YYYY-MM-DD HH:MM:SS</inferTime>
    <inferTimeUnc>YYYY-MM-DD HH:MM:SS</inferTimeUnc>
    <startTime>YYYY-MM-DD HH:MM:SS</startTime>
    <startTimeUnc>YYYY-MM-DD HH:MM:SS</startTimeUnc>
    <endTime>YYYY-MM-DD HH:MM:SS</endTime>
    <endTimeUnc>YYYY-MM-DD HH:MM:SS</endTimeUnc>
    <tectonicChanges>Y</tectonicChanges>
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</wovoml>
```

Appendix-2 WOVOML 1.1.0 Schema

WOVOml_schema.xsd (version: September 2014)

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="http://www.wovodat.org" xmlns="http://www.wovodat.org" elementFormDefault="qualified">

	<!-- ================================================================= -->
	<!-- Comments on this XSD file -->
	<!-- ================================================================= -->
	<xs:annotation>
	  <xs:documentation xml:lang="en">
			WOVOML schema for uploading data to WOVOdat (www.wovodat.org).
			Version 1.1.0
			Last update: August 2014.
			For more information on how to use WOVOML, please refer to: www.wovodat.org/doc
	  </xs:documentation>
	</xs:annotation>


	<!-- ================================================================= -->
	<!-- Simple types -->
	<!-- ================================================================= -->

	<!-- Decimal 2,2  -->
	<xs:simpleType name="decimal">
	  <xs:restriction base="xs:decimal">
			<xs:minExclusive value="-0.99"/>
			<xs:maxExclusive value="0.991"/>
	  </xs:restriction>
	</xs:simpleType>

	<!-- Double without NaN -Inf +Inf -->
	<xs:simpleType name="double">
	  <xs:restriction base="xs:double">
			<xs:minExclusive value="-INF"/>
			<xs:maxExclusive value="INF"/>
	  </xs:restriction>
	</xs:simpleType>

	<!-- Float without NaN -Inf +Inf -->
	<xs:simpleType name="float">
	  <xs:restriction base="xs:float">
			<xs:minExclusive value="-INF"/>
			<xs:maxExclusive value="INF"/>
	  </xs:restriction>
	</xs:simpleType>

	<!-- String 10 -->
	<xs:simpleType name="string10">
	  <xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:maxLength value="10"/>
	  </xs:restriction>
	</xs:simpleType>

	<!-- String 15 -->
	<xs:simpleType name="string15NE">
	  <xs:restriction base="xs:string">
```

```
            <xs:whiteSpace value="collapse"/>
            <xs:minLength value="1"/>
            <xs:maxLength value="15"/>
  </xs:restriction>
</xs:simpleType>

<!-- String 12 -->
<xs:simpleType name="string12">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:maxLength value="12"/>
  </xs:restriction>
</xs:simpleType>

<!-- String 12 (non-empty) -->
<xs:simpleType name="string12NE">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
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            <xs:maxLength value="12"/>
  </xs:restriction>
</xs:simpleType>

<!-- String 30 -->
<xs:simpleType name="string30">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:maxLength value="30"/>
  </xs:restriction>
</xs:simpleType>

<!-- String 30 (non-empty) -->
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  <xs:restriction base="xs:string">
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            <xs:maxLength value="30"/>
  </xs:restriction>
</xs:simpleType>

<!-- String 50 -->
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</xs:simpleType>

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<!-- String 255 -->
<xs:simpleType name="string255">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:maxLength value="255"/>
  </xs:restriction>
</xs:simpleType>
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```
<!-- String 255 (non-empty) -->
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</xs:simpleType>

<!-- Degrees 0-90 -->
<xs:simpleType name="deg0-90">
  <xs:restriction base="xs:double">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="90"/>
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</xs:simpleType>

<!-- Degrees 0-360 -->
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  <xs:restriction base="xs:double">
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  </xs:restriction>
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<!-- Degrees -90 +90 -->
<xs:simpleType name="deg-90-90">
  <xs:restriction base="xs:double">
            <xs:minInclusive value="-90"/>
            <xs:maxInclusive value="90"/>
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</xs:simpleType>

<!-- Degrees -180 +180 -->
<xs:simpleType name="deg-180-180">
  <xs:restriction base="xs:double">
            <xs:minInclusive value="-180"/>
            <xs:maxInclusive value="180"/>
  </xs:restriction>
</xs:simpleType>

<!-- Yes No enumeration -->
<xs:simpleType name="yesNoEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="Y"/>
            <xs:enumeration value="N"/>
  </xs:restriction>
</xs:simpleType>

<!-- Success enumeration -->
<xs:simpleType name="successEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
```

```
            <xs:enumeration value="Y"/>
            <xs:enumeration value="N"/>
            <xs:enumeration value="P"/>
    </xs:restriction>
</xs:simpleType>

<!-- Yes No Unknown enumeration -->
<xs:simpleType name="yesNoUnkEnum">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="Y"/>
            <xs:enumeration value="N"/>
            <xs:enumeration value="U"/>
    </xs:restriction>
</xs:simpleType>

<!-- Yes No Maybe Unknown enumeration -->
<xs:simpleType name="yesNoMaybeUnkEnum">
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            <xs:whiteSpace value="collapse"/>
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            <xs:enumeration value="N"/>
            <xs:enumeration value="M"/>
            <xs:enumeration value="U"/>
    </xs:restriction>
</xs:simpleType>

<!-- Permanent campaign enumeration -->
<xs:simpleType name="permCampEnum">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
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            <xs:enumeration value="C"/>
    </xs:restriction>
</xs:simpleType>

<!-- Continuous periodically enumeration -->
<xs:simpleType name="contPeriodEnum">
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            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="C"/>
            <xs:enumeration value="P"/>
    </xs:restriction>
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<!-- Processed raw enumeration -->
<xs:simpleType name="processedEnum">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="P"/>
            <xs:enumeration value="R"/>
    </xs:restriction>
</xs:simpleType>

<!-- Pressure measurement type enumeration -->
<xs:simpleType name="pressureMeasTypeEnum">
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            <xs:whiteSpace value="collapse"/>
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    </xs:restriction>
</xs:simpleType>
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```
<!-- Pair stacked enumeration -->
<xs:simpleType name="pairStackedEnum">
  <xs:restriction base="xs:string">
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            <xs:enumeration value="P"/>
            <xs:enumeration value="S"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
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<!-- Picks determination enumeration -->
<xs:simpleType name="picksDeterminationEnum">
  <xs:restriction base="xs:string">
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            <xs:enumeration value="A"/>
            <xs:enumeration value="H"/>
            <xs:enumeration value="R"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
</xs:simpleType>

<!-- Qualitative depth enumeration -->
<xs:simpleType name="qualitativeDepthEnum">
  <xs:restriction base="xs:string">
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            <xs:enumeration value="S"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
</xs:simpleType>

<!-- Data type enumeration -->
<xs:simpleType name="dataTypeEnum">
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<!-- Distance enumeration -->
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</xs:simpleType>

<!-- Quality enumeration -->
<xs:simpleType name="qualityEnum">
  <xs:restriction base="xs:string">
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            <xs:enumeration value="G"/>
            <xs:enumeration value="P"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
```

```
</xs:simpleType>

<!-- DEM quality enumeration -->
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            <xs:enumeration value="F"/>
            <xs:enumeration value="G"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
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<!-- Start position enumeration -->
<xs:simpleType name="startPositionEnum">
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            <xs:enumeration value="TLC"/>
  </xs:restriction>
</xs:simpleType>

<!-- Limb enumeration -->
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            <xs:whiteSpace value="collapse"/>
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  </xs:restriction>
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<!-- Precipitation type enumeration -->
<xs:simpleType name="precipitationTypeEnum">
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            <xs:enumeration value="S-R"/>
            <xs:enumeration value="S-FR"/>
            <xs:enumeration value="S-H"/>
            <xs:enumeration value="H-R"/>
            <xs:enumeration value="H-FR"/>
            <xs:enumeration value="H-S"/>
  </xs:restriction>
</xs:simpleType>

<!-- Earthquake type enumeration -->
<xs:simpleType name="eqTypeEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="R"/>
            <xs:enumeration value="Q"/>
            <xs:enumeration value="V"/>
            <xs:enumeration value="VT"/>
            <xs:enumeration value="VT_D"/>
```

```
            <xs:enumeration value="VT_S"/>
            <xs:enumeration value="H"/>
            <xs:enumeration value="H_HLF"/>
            <xs:enumeration value="H_LHF"/>
            <xs:enumeration value="LF"/>
            <xs:enumeration value="LF_LP"/>
            <xs:enumeration value="LF_T"/>
            <xs:enumeration value="LF_ILF"/>
            <xs:enumeration value="VLP"/>
            <xs:enumeration value="RF"/>
            <xs:enumeration value="E"/>
            <xs:enumeration value="U"/>
            <xs:enumeration value="O"/>
            <xs:enumeration value="X"/>
            <xs:enumeration value="G"/>
            <xs:enumeration value="PF"/>
  </xs:restriction>
</xs:simpleType>

<!-- Tremor type enumeration -->
<xs:simpleType name="trmTypeEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="G"/>
            <xs:enumeration value="M"/>
            <xs:enumeration value="H"/>
            <xs:enumeration value="C"/>
  </xs:restriction>
</xs:simpleType>

<!-- Gas species enumeration -->
<xs:simpleType name="gasSpeciesEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="CO2"/>
            <xs:enumeration value="SO2"/>
            <xs:enumeration value="H2S"/>
            <xs:enumeration value="HCl"/>
            <xs:enumeration value="HF"/>
            <xs:enumeration value="CH4"/>
            <xs:enumeration value="H2"/>
            <xs:enumeration value="CO"/>
            <xs:enumeration value="3He4He"/>
            <xs:enumeration value="d13C"/>
            <xs:enumeration value="d34S"/>
            <xs:enumeration value="d18O"/>
            <xs:enumeration value="dD"/>
            <xs:enumeration value="NH3"/>
            <xs:enumeration value="N2"/>
            <xs:enumeration value="Ar"/>
  </xs:restriction>
</xs:simpleType>


<!-- Waveform distance enumeration -->
<xs:simpleType name="wavefromdistanceEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="P"/>
            <xs:enumeration value="I"/>
            <xs:enumeration value="D"/>
            <xs:enumeration value="U"/>
  </xs:restriction>
```

```
</xs:simpleType>

<!-- Plume species enumeration -->
<xs:simpleType name="plumeSpeciesEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="CO2"/>
            <xs:enumeration value="SO2"/>
            <xs:enumeration value="H2S"/>
            <xs:enumeration value="HCl"/>
            <xs:enumeration value="HF"/>
            <xs:enumeration value="CO"/>
  </xs:restriction>
</xs:simpleType>

<!-- Hydrologic species enumeration -->
<xs:simpleType name="hydroSpeciesEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="SO4"/>
            <xs:enumeration value="H2S"/>
            <xs:enumeration value="Cl"/>
            <xs:enumeration value="F"/>
            <xs:enumeration value="HCO3"/>
            <xs:enumeration value="Mg"/>
            <xs:enumeration value="Fe"/>
            <xs:enumeration value="Ca"/>
            <xs:enumeration value="Na"/>
            <xs:enumeration value="K"/>
            <xs:enumeration value="3He4He"/>
            <xs:enumeration value="c3He4He"/>
            <xs:enumeration value="d13C"/>
            <xs:enumeration value="d34S"/>
            <xs:enumeration value="dD"/>
            <xs:enumeration value="d18O"/>
            <xs:enumeration value="B"/>
            <xs:enumeration value="Li"/>
            <xs:enumeration value="SiO2"/>
            <xs:enumeration value="R2O3"/>
            <xs:enumeration value="SiO3"/>
            <xs:enumeration value="CO2"/>
            <xs:enumeration value="As"/>
            <xs:enumeration value="Ba"/>
            <xs:enumeration value="Al"/>
            <xs:enumeration value="NULL"/>
  </xs:restriction>
</xs:simpleType>

<!-- Original recalculated enumeration -->
<xs:simpleType name="oriRecalEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="O"/>
            <xs:enumeration value="R"/>
  </xs:restriction>
</xs:simpleType>

<!-- Digitize Original enumeration -->
<xs:simpleType name="orgDigEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="D"/>
            <xs:enumeration value="O"/>
```

```
  </xs:restriction>
</xs:simpleType>

<!-- General Deformation Instrument enumeration -->
<xs:simpleType name="diGenTypeEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="Angle"/>
            <xs:enumeration value="CGPS"/>
            <xs:enumeration value="EDM"/>
            <xs:enumeration value="EDM_Reflector"/>
            <xs:enumeration value="GPS"/>
            <xs:enumeration value="Total_Station"/>
            <xs:enumeration value="OtherTypes"/>
  </xs:restriction>
</xs:simpleType>

<!-- Deformation Tilt/Strain instrument enumeration -->
<xs:simpleType name="diTltTypeEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="Tilt"/>
            <xs:enumeration value="Strain"/>
  </xs:restriction>
</xs:simpleType>

<!-- sd_evs First Motion enumeration -->
<xs:simpleType name="firMotionEnum">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:enumeration value="Up"/>
            <xs:enumeration value="Down"/>
            <xs:enumeration value="Unknown"/>
  </xs:restriction>
</xs:simpleType>

<!-- Time -->
<xs:simpleType name="time">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:length value="8"/>
            <xs:pattern value="[0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
  </xs:restriction>
</xs:simpleType>

<!-- Date time (BC accepted) -->
<xs:simpleType name="dateTimeBC">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value=""/>
            <xs:pattern value="([ ])*"/>
            <xs:pattern value="[0-9]{1}-0[0-9]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{1}-0[0-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{1}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{1}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{1}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{1}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
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```

```
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```

```
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            <xs:pattern value="-[0-9]{5}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="-[0-9]{5}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
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    </xs:restriction>
</xs:simpleType>

<!-- Date time -->
<xs:simpleType name="dateTime">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9]"/>
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            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
    </xs:restriction>
</xs:simpleType>

<!-- Date time (can be empty) -->
<xs:simpleType name="dateTimeEmpty">
    <xs:restriction base="xs:string">
```

```
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value=""/>
            <xs:pattern value="([ ])*"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
    </xs:restriction>
</xs:simpleType>

<!-- Date time with microseconds -->
<xs:simpleType name="dateTimemsec">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[1-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-0[1-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
    </xs:restriction>
</xs:simpleType>

<!-- Date time uncertainty -->
<xs:simpleType name="dateTimeUnc">
    <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
```

```
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
  </xs:restriction>
</xs:simpleType>

<!-- Date time uncertainty with microseconds -->
<xs:simpleType name="dateTimeUncmsec">
  <xs:restriction base="xs:string">
            <xs:whiteSpace value="collapse"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
            <xs:pattern value="[0-9]{4}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
  </xs:restriction>
</xs:simpleType>


<!-- ================================================================= -->
<!-- Attribute groups -->
<!-- ================================================================= -->
<!-- Owners + publish date -->
<xs:attributeGroup name="OwnersPubDateGroup">
  <xs:attribute name="owner1" type="string15NE"/>
  <xs:attribute name="owner2" type="string15NE"/>
  <xs:attribute name="owner3" type="string15NE"/>
  <xs:attribute name="pubDate" type="dateTime"/>
  <xs:attribute name="v" type="xs:string"/>
</xs:attributeGroup>

  <!-- ================================================================= -->
<!-- Groups -->
<!-- ================================================================= -->
<!-- Common network -->
<xs:group name="CommonNetworkGroup">
  <xs:sequence>
            <xs:element name="Volcanoes" type="VolcanoesType"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="area" type="float" minOccurs="0"/>
            <xs:element name="commonNetMap" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
```

```
  </xs:sequence>
</xs:group>

<!-- Latitude longitude group -->
<xs:group name="latLonGroup">
  <xs:sequence>
        <xs:element name="lat" type="deg-90-90"/>
        <xs:element name="lon" type="deg-180-180"/>
  </xs:sequence>
</xs:group>

<!-- Instrument latitude longitude group -->
<xs:group name="instLatLonGroup">
  <xs:sequence>
        <xs:element name="instLat" type="deg-90-90"/>
        <xs:element name="instLon" type="deg-180-180"/>
  </xs:sequence>
</xs:group>

<!-- Start latitude longitude group -->
<xs:group name="startLatLonGroup">
  <xs:sequence>
        <xs:element name="startLat" type="deg-90-90"/>
        <xs:element name="startLon" type="deg-180-180"/>
  </xs:sequence>
</xs:group>

<!-- Moment tensor -->
<xs:group name="momentTensorGroup">
  <xs:sequence>
        <xs:element name="momentTensorScale" type="float"/>
        <xs:element name="momentTensorXX" type="float"/>
        <xs:element name="momentTensorXY" type="float"/>
        <xs:element name="momentTensorXZ" type="float"/>
        <xs:element name="momentTensorYY" type="float"/>
        <xs:element name="momentTensorYZ" type="float"/>
        <xs:element name="momentTensorZZ" type="float"/>
  </xs:sequence>
</xs:group>


<!-- ================================================================= -->
<!-- Complex types -->
<!-- ================================================================= -->
<!-- wovoml (root) -->
<xs:complexType name="wovomlType">
  <xs:sequence>
        <!-- Observations -->
        <xs:element name="Observations" type="ObservationsType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Inferred processes -->
        <xs:element name="InferredProcesses" type="InferredProcessesType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Eruptions -->
        <xs:element name="Eruptions" type="EruptionsType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Monitoring systems -->
        <xs:element name="MonitoringSystems" type="MonitoringSystemsType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Data -->
        <xs:element name="Data" type="DataType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="version" type="xs:string" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Observations -->
```

```
<xs:complexType name="ObservationsType">
  <xs:sequence>
        <!-- Observation -->
        <xs:element name="Observation" type="ObservationType" minOccurs="1" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Observation -->
<xs:complexType name="ObservationType">
  <xs:sequence>
        <xs:element name="description" type="xs:string"/>
        <xs:element name="startTime" type="dateTime" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Inferred processes -->
<xs:complexType name="InferredProcessesType">
  <xs:sequence>
        <!-- Magma movement -->
        <xs:element name="MagmaMovement" type="MagmaMovementType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Volatile saturation -->
        <xs:element name="VolatileSat" type="VolatileSatType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Magma pressure -->
        <xs:element name="MagmaPressure" type="MagmaPressureType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Hydrothermal -->
        <xs:element name="Hydrothermal" type="HydrothermalType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Regional tectonics -->
        <xs:element name="RegionalTectonics" type="RegionalTectonicsType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Magma movement -->
<xs:complexType name="MagmaMovementType">
  <xs:sequence>
        <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
        <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="deepSupp" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="ascent" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="convecBelow" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="convecAbove" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="magmaMix" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="dikeIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="pipeIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="sillIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
```

```
    <xs:attribute name="volcano" type="string12NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Volatile saturation -->
<xs:complexType name="VolatileSatType">
    <xs:sequence>
                <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="CO2Sat" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="H2OSat" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="decompress" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="fugacity" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="volatileAdd" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="crystalOr2ndBoil" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="vesicul" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="devesicul" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="degas" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="volcano" type="string12NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Magma pressure -->
<xs:complexType name="MagmaPressureType">
    <xs:sequence>
                <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="gasInduced" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="tectInduced" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="volcano" type="string12NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Hydrothermal -->
<xs:complexType name="HydrothermalType">
    <xs:sequence>
                <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="heatGwater" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="poreDestab" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="poreDeform" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="hydrofract" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                <xs:element name="boilTremor" type="yesNoMaybeUnkEnum" minOccurs="0"/>
```

```
            <xs:element name="absorSolGas" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="speciesEqbChange" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="boilDryChimneys" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Regional tectonics -->
<xs:complexType name="RegionalTectonicsType">
  <xs:sequence>
            <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
            <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime" minOccurs="0"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="tectonicChanges" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="staticStress" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="dynamicStrain" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="localShear" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="slowEarthquake" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="distalPressure" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="distalDepressure" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="hydrothermalLubrication" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="earthTide" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="atmosInfluence" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Eruptions -->
<xs:complexType name="EruptionsType">
  <xs:sequence>
            <!-- Eruption -->
            <xs:element name="Eruption" type="EruptionType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Phase alone -->
            <xs:element name="Phases" type="PhasesType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Video alone -->
            <xs:element name="Video" type="VideoAloneType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Forecast alone -->
            <xs:element name="Forecast" type="ForecastAloneType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Eruption -->
<xs:complexType name="EruptionType">
  <xs:sequence>
            <!-- Eruption information -->
            <xs:element name="name" type="string60" minOccurs="0"/>
            <xs:element name="narrative" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTimeBC"/>
            <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
```

```
            <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
            <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="climaxTime" type="dateTimeBC" minOccurs="0"/>
            <xs:element name="climaxTimeBC" type="xs:integer" minOccurs="0"/>
            <xs:element name="climaxTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Video -->
            <xs:element name="Video" type="VideoType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Phase -->
            <xs:element name="Phase" type="PhaseType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Phase -->
<xs:complexType name="PhaseType">
  <xs:sequence>
            <!-- Phase information -->
            <xs:element name="phaseNumber" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTimeBC"/>
            <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
            <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="vei" type="xs:integer" minOccurs="0"/>
            <xs:element name="maxLavaExtru" type="float" minOccurs="0"/>
            <xs:element name="maxExpMassDis" type="float" minOccurs="0"/>
            <xs:element name="dre" type="float" minOccurs="0"/>
            <xs:element name="magmaMix" type="yesNoUnkEnum" minOccurs="0"/>
            <xs:element name="maxColHeight" type="float" minOccurs="0"/>
            <xs:element name="colHeightDet" type="string255" minOccurs="0"/>
            <xs:element name="minSiO2MatrixGlass" type="float" minOccurs="0"/>
            <xs:element name="maxSiO2MatrixGlass" type="float" minOccurs="0"/>
            <xs:element name="minSiO2WholeRock" type="float" minOccurs="0"/>
            <xs:element name="maxSiO2WholeRock" type="float" minOccurs="0"/>
            <xs:element name="totCrystal" type="float" minOccurs="0"/>
            <xs:element name="phenoContent" type="float" minOccurs="0"/>
            <xs:element name="phenoAssemb" type="string255" minOccurs="0"/>
            <xs:element name="preErupH2OContent" type="float" minOccurs="0"/>
            <xs:element name="phenoMeltInclusion" type="string255" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Video -->
            <xs:element name="Video" type="VideoType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Forecast -->
            <xs:element name="Forecast" type="ForecastType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Phases -->
<xs:complexType name="PhasesType">
  <xs:sequence>
            <!-- Phase alone -->
            <xs:element name="Phase" type="PhaseAloneType" minOccurs="1" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="eruption" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
```

```
</xs:complexType>

<!-- Phase alone -->
<xs:complexType name="PhaseAloneType">
  <xs:sequence>
        <!-- Phase information -->
        <xs:element name="phaseNumber" type="float" minOccurs="0"/>
        <xs:element name="startTime" type="dateTimeBC"/>
        <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
        <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="vei" type="xs:integer" minOccurs="0"/>
        <xs:element name="maxLavaExtru" type="float" minOccurs="0"/>
        <xs:element name="maxExpMassDis" type="float" minOccurs="0"/>
        <xs:element name="dre" type="float" minOccurs="0"/>
        <xs:element name="magmaMix" type="yesNoUnkEnum" minOccurs="0"/>
        <xs:element name="maxColHeight" type="float" minOccurs="0"/>
        <xs:element name="colHeightDet" type="string255" minOccurs="0"/>
        <xs:element name="minSiO2MatrixGlass" type="float" minOccurs="0"/>
        <xs:element name="maxSiO2MatrixGlass" type="float" minOccurs="0"/>
        <xs:element name="minSiO2WholeRock" type="float" minOccurs="0"/>
        <xs:element name="maxSiO2WholeRock" type="float" minOccurs="0"/>
        <xs:element name="totCrystal" type="float" minOccurs="0"/>
        <xs:element name="phenoContent" type="float" minOccurs="0"/>
        <xs:element name="phenoAssemb" type="string255" minOccurs="0"/>
        <xs:element name="preErupH2OContent" type="float" minOccurs="0"/>
        <xs:element name="phenoMeltInclusion" type="string255" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- Video -->
        <xs:element name="Video" type="VideoType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Forecast -->
        <xs:element name="Forecast" type="ForecastType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="eruption" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Video -->
<xs:complexType name="VideoType">
  <xs:sequence>
        <xs:element name="link" type="string255"/>
        <xs:element name="startTime" type="dateTime" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="length" type="time" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Video alone -->
<xs:complexType name="VideoAloneType">
  <xs:sequence>
        <xs:element name="link" type="string255"/>
        <xs:element name="startTime" type="dateTime" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="length" type="time" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
```

```
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="eruption" type="string30NE"/>
            <xs:attribute name="phase" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Forecast -->
        <xs:complexType name="ForecastType">
            <xs:sequence>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="earliestStartTime" type="dateTime" minOccurs="0"/>
                <xs:element name="earliestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="latestStartTime" type="dateTime" minOccurs="0"/>
                <xs:element name="latestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="issueTime" type="dateTime"/>
                <xs:element name="issueTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="timeSuccess" type="successEnum" minOccurs="0"/>
                <xs:element name="magniSuccess" type="successEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Forecast alone -->
        <xs:complexType name="ForecastAloneType">
            <xs:sequence>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="earliestStartTime" type="dateTime" minOccurs="0"/>
                <xs:element name="earliestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="latestStartTime" type="dateTime" minOccurs="0"/>
                <xs:element name="latestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="issueTime" type="dateTime"/>
                <xs:element name="issueTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="timeSuccess" type="successEnum" minOccurs="0"/>
                <xs:element name="magniSuccess" type="successEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="phase" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Monitoring systems -->
        <xs:complexType name="MonitoringSystemsType">
            <xs:sequence>
                <!-- Airplane -->
                <xs:element name="Airplane" type="AirplaneType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Satellite -->
                <xs:element name="Satellite" type="SatelliteType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Deformation network -->
                <xs:element name="DeformationNetwork" type="DeformationNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Deformation stations -->
                <xs:element name="DeformationStations" type="DeformationStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Deformation instruments -->
                <xs:element name="DeformationInstruments" type="DeformationInstrumentsType" minOccurs="0" maxOccurs="unboun-
ded"/>
                <!-- Gas network -->
                <xs:element name="GasNetwork" type="GasNetworkType" minOccurs="0" maxOccurs="unbounded"/>
```

```
                <!-- Gas stations -->
                <xs:element name="GasStations" type="GasStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Gas instruments -->
                <xs:element name="GasInstruments" type="GasInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Hydrologic network -->
                <xs:element name="HydrologicNetwork" type="HydrologicNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Hydrologic stations -->
                <xs:element name="HydrologicStations" type="HydrologicStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Hydrologic instruments -->
                <xs:element name="HydrologicInstruments" type="HydrologicInstrumentsType" minOccurs="0" maxOccurs="unboun-
ded"/>
                <!-- Fields network -->
                <xs:element name="FieldsNetwork" type="FieldsNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Fields stations -->
                <xs:element name="FieldsStations" type="FieldsStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Fields instruments -->
                <xs:element name="FieldsInstruments" type="FieldsInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Thermal network -->
                <xs:element name="ThermalNetwork" type="ThermalNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Thermal stations -->
                <xs:element name="ThermalStations" type="ThermalStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Thermal instruments -->
                <xs:element name="ThermalInstruments" type="ThermalInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Meteo network -->
                <xs:element name="MeteoNetwork" type="MeteoNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Meteo stations -->
                <xs:element name="MeteoStations" type="MeteoStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Meteo instruments -->
                <xs:element name="MeteoInstruments" type="MeteoInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Seismic network -->
                <xs:element name="SeismicNetwork" type="SeismicNetworkType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Seismic stations -->
                <xs:element name="SeismicStations" type="SeismicStationsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Seismic instruments -->
                <xs:element name="SeismicInstruments" type="SeismicInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Seismic components -->
                <xs:element name="SeismicComponents" type="SeismicComponentsType" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Airplane -->
    <xs:complexType name="AirplaneType">
        <xs:sequence>
                <xs:element name="name" type="string50" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Gas instrument -->
                <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Thermal instrument -->
                <xs:element name="ThermalInstrument" type="ThermalInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>
```

```
        <!-- Satellite -->
        <xs:complexType name="SatelliteType">
          <xs:sequence>
                    <xs:element name="name" type="string50" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Gas instrument -->
                    <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Thermal instrument -->
                    <xs:element name="ThermalInstrument" type="ThermalInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Deformation instrument  -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType" minOccurs="0" maxOccurs="unboun-
ded"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>


        <!-- Deformation network -->
        <xs:complexType name="DeformationNetworkType">
          <xs:sequence>
                    <xs:group ref="CommonNetworkGroup"/>
                    <!-- Deformation station -->
                    <xs:element name="DeformationStation" type="DeformationStationType" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Deformation station -->
        <xs:complexType name="DeformationStationType">
          <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="horizPrecision" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="refStation" type="yesNoEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- Deformation instrument -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType" minOccurs="0" maxOccurs="unboun-
ded"/>
                    <!-- Tilt/Instrument instrument -->
                    <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>
```

```
        <!-- Deformation stations -->
        <xs:complexType name="DeformationStationsType">
          <xs:sequence>
                    <!-- Deformation station -->
                    <xs:element name="DeformationStation" type="DeformationStationAloneType" minOccurs="0" maxOc-
curs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="network" type="string30NE"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Deformation station alone -->
        <xs:complexType name="DeformationStationAloneType">
          <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="horizPrecision" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="refStation" type="yesNoEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Deformation instrument -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType" minOccurs="0" maxOccurs="unboun-
ded"/>
                    <!-- Tilt/Instrument instrument -->
                    <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attribute name="network" type="string30NE"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Deformation instrument -->
        <xs:complexType name="DeformationInstrumentType">
          <xs:sequence>
                    <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="diGenTypeEnum" />
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="resolution" type="float" minOccurs="0"/>
                    <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Tilt/Strain instrument -->
        <xs:complexType name="TiltStrainInstrumentType">
          <xs:sequence>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="type" type="diTltTypeEnum"/>
```

```
                <xs:element name="depth" type="float" minOccurs="0"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="direction1" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction2" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction3" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction4" type="deg0-360" minOccurs="0"/>
                <xs:element name="electroConv1" type="float" minOccurs="0"/>
                <xs:element name="electroConv2" type="float" minOccurs="0"/>
                <xs:element name="electroConv3" type="float" minOccurs="0"/>
                <xs:element name="electroConv4" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Deformation instruments -->
        <xs:complexType name="DeformationInstrumentsType">
            <xs:sequence>
                <!-- Deformation instrument -->
                <xs:element name="DeformationInstrument" type="DeformationInstrumentAloneType" minOccurs="0" maxOccurs="un-
bounded"/>
                <!-- Tilt/Strain instrument -->
                <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentAloneType" minOccurs="0" maxOccurs="unboun-
ded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Deformation instrument alone -->
        <xs:complexType name="DeformationInstrumentAloneType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="diGenTypeEnum" />
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Tilt/Strain instrument alone -->
        <xs:complexType name="TiltStrainInstrumentAloneType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="diTltTypeEnum"/>
                <xs:element name="depth" type="float" minOccurs="0"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
```

```
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="direction1" type="deg0-360" minOccurs="0"/>
            <xs:element name="direction2" type="deg0-360" minOccurs="0"/>
            <xs:element name="direction3" type="deg0-360" minOccurs="0"/>
            <xs:element name="direction4" type="deg0-360" minOccurs="0"/>
            <xs:element name="electroConv1" type="float" minOccurs="0"/>
            <xs:element name="electroConv2" type="float" minOccurs="0"/>
            <xs:element name="electroConv3" type="float" minOccurs="0"/>
            <xs:element name="electroConv4" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas network -->
<xs:complexType name="GasNetworkType">
  <xs:sequence>
            <xs:group ref="CommonNetworkGroup"/>
            <!-- Gas station -->
            <xs:element name="GasStation" type="GasStationType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas station -->
<xs:complexType name="GasStationType">
  <xs:sequence>
            <xs:element name="name" type="string50" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Gas instrument -->
            <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas instrument -->
<xs:complexType name="GasInstrumentType">
  <xs:sequence>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="signalToNoise" type="float" minOccurs="0"/>
```

```
            <xs:element name="calibration" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas stations -->
<xs:complexType name="GasStationsType">
  <xs:sequence>
            <!-- Gas station -->
            <xs:element name="GasStation" type="GasStationAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas station alone -->
<xs:complexType name="GasStationAloneType">
  <xs:sequence>
            <xs:element name="name" type="string50" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Gas instrument -->
            <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas instruments -->
<xs:complexType name="GasInstrumentsType">
  <xs:sequence>
            <!-- Gas instrument -->
            <xs:element name="GasInstrument" type="GasInstrumentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="airplane" type="string30NE"/>
  <xs:attribute name="satellite" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas instrument alone -->
<xs:complexType name="GasInstrumentAloneType">
  <xs:sequence>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
```

```
                <xs:element name="units" type="string50" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                <xs:element name="calibration" type="string255" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="airplane" type="string30NE"/>
        <xs:attribute name="satellite" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic network -->
    <xs:complexType name="HydrologicNetworkType">
        <xs:sequence>
                <xs:group ref="CommonNetworkGroup"/>
                <!-- Hydrologic station -->
                <xs:element name="HydrologicStation" type="HydrologicStationType" minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic station -->
    <xs:complexType name="HydrologicStationType">
        <xs:sequence>
                <xs:group ref="latLonGroup" minOccurs="0"/>
                <xs:element name="elev" type="float" minOccurs="0"/>
                <xs:element name="permInst" type="string255" minOccurs="0"/>
                <xs:element name="name" type="string30" minOccurs="0"/>
                <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
                <xs:element name="diffUTC" type="float" minOccurs="0"/>
                <xs:element name="screenTop" type="float" minOccurs="0"/>
                <xs:element name="screenBottom" type="float" minOccurs="0"/>
                <xs:element name="wellDepth" type="double" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Hydrologic instrument -->
                <xs:element name="HydrologicInstrument" type="HydrologicInstrumentType" minOccurs="0" maxOc-
curs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic instrument -->
    <xs:complexType name="HydrologicInstrumentType">
        <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string50" minOccurs="0"/>
                <xs:element name="pressureMeasType" type="pressureMeasTypeEnum" minOccurs="0"/>
                <xs:element name="units" type="string50" minOccurs="0"/>
```

```
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic stations -->
        <xs:complexType name="HydrologicStationsType">
            <xs:sequence>
                <!-- Hydrologic station alone -->
                <xs:element name="HydrologicStation" type="HydrologicStationAloneType" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic station alone -->
        <xs:complexType name="HydrologicStationAloneType">
            <xs:sequence>
                <xs:group ref="latLonGroup" minOccurs="0"/>
                <xs:element name="elev" type="float" minOccurs="0"/>
                <xs:element name="permInst" type="string255" minOccurs="0"/>
                <xs:element name="name" type="string30" minOccurs="0"/>
                <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
                <xs:element name="diffUTC" type="float" minOccurs="0"/>
                <xs:element name="screenTop" type="float" minOccurs="0"/>
                <xs:element name="screenBottom" type="float" minOccurs="0"/>
                <xs:element name="wellDepth" type="double" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Hydrologic instrument -->
                <xs:element name="HydrologicInstrument" type="HydrologicInstrumentType" minOccurs="0" maxOc-
curs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic instruments -->
        <xs:complexType name="HydrologicInstrumentsType">
            <xs:sequence>
                <!-- Hydrologic instrument -->
                <xs:element name="HydrologicInstrument" type="HydrologicInstrumentAloneType" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic instrument alone -->
        <xs:complexType name="HydrologicInstrumentAloneType">
```

```
  <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string50" minOccurs="0"/>
            <xs:element name="pressureMeasType" type="pressureMeasTypeEnum" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields network -->
<xs:complexType name="FieldsNetworkType">
  <xs:sequence>
            <xs:group ref="CommonNetworkGroup"/>
            <!-- Fields station -->
            <xs:element name="FieldsStation" type="FieldsStationType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields station -->
<xs:complexType name="FieldsStationType">
  <xs:sequence>
            <xs:element name="name" type="string50" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>

            <!-- Fields instrument -->
            <xs:element name="FieldsInstrument" type="FieldsInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields instrument -->
<xs:complexType name="FieldsInstrumentType">
  <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="units" type="string255" minOccurs="0"/>
            <xs:element name="sampleRate" type="float" minOccurs="0"/>
            <xs:element name="filterType" type="string255" minOccurs="0"/>
            <xs:element name="orientation" type="string255" minOccurs="0"/>
```

```
            <xs:element name="calculation" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields stations -->
<xs:complexType name="FieldsStationsType">
  <xs:sequence>
            <!-- Fields station alone -->
            <xs:element name="FieldsStation" type="FieldsStationAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields station alone -->
<xs:complexType name="FieldsStationAloneType">
  <xs:sequence>
            <xs:element name="name" type="string50" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Fields instrument -->
            <xs:element name="FieldsInstrument" type="FieldsInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields instruments -->
<xs:complexType name="FieldsInstrumentsType">
  <xs:sequence>
            <!-- Fields instrument alone -->
            <xs:element name="FieldsInstrument" type="FieldsInstrumentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Fields instrument alone -->
<xs:complexType name="FieldsInstrumentAloneType">
  <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="units" type="string255" minOccurs="0"/>
            <xs:element name="sampleRate" type="float" minOccurs="0"/>
```

```
            <xs:element name="filterType" type="string255" minOccurs="0"/>
            <xs:element name="orientation" type="string255" minOccurs="0"/>
            <xs:element name="calculation" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal network -->
<xs:complexType name="ThermalNetworkType">
  <xs:sequence>
            <xs:group ref="CommonNetworkGroup"/>
            <!-- Thermal station -->
            <xs:element name="ThermalStation" type="ThermalStationType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal station -->
<xs:complexType name="ThermalStationType">
  <xs:sequence>
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:element name="thermalFeatType" type="string255" minOccurs="0"/>
            <xs:element name="groundType" type="string255" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Thermal instrument -->
            <xs:element name="ThermalInstrument" type="ThermalInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal stations -->
<xs:complexType name="ThermalStationsType">
  <xs:sequence>
            <!-- Thermal station -->
            <xs:element name="ThermalStation" type="ThermalStationAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal station alone -->
<xs:complexType name="ThermalStationAloneType">
  <xs:sequence>
```

```
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:element name="thermalFeatType" type="string255" minOccurs="0"/>
            <xs:element name="groundType" type="string255" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Thermal instrument -->
            <xs:element name="ThermalInstrument" type="ThermalInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal instrument -->
<xs:complexType name="ThermalInstrumentType">
  <xs:sequence>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="signalToNoise" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal instruments -->
<xs:complexType name="ThermalInstrumentsType">
  <xs:sequence>
            <!-- Thermal instrument -->
            <xs:element name="ThermalInstrument" type="ThermalInstrumentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="airplane" type="string30NE"/>
  <xs:attribute name="satellite" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal instrument alone -->
<xs:complexType name="ThermalInstrumentAloneType">
  <xs:sequence>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="signalToNoise" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
```

```
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="airplane" type="string30NE"/>
    <xs:attribute name="satellite" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo network -->
<xs:complexType name="MeteoNetworkType">
    <xs:sequence>
            <xs:group ref="CommonNetworkGroup"/>
            <!-- Meteo station -->
            <xs:element name="MeteoStation" type="MeteoStationType" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo station -->
<xs:complexType name="MeteoStationType">
    <xs:sequence>
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Meteo instrument -->
            <xs:element name="MeteoInstrument" type="MeteoInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo instrument -->
<xs:complexType name="MeteoInstrumentType">
    <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string50" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
```

```
</xs:complexType>

<!-- Meteo stations -->
<xs:complexType name="MeteoStationsType">
  <xs:sequence>
        <!-- Meteo station alone -->
        <xs:element name="MeteoStation" type="MeteoStationAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo station alone -->
<xs:complexType name="MeteoStationAloneType">
  <xs:sequence>
        <xs:element name="name" type="string30" minOccurs="0"/>
        <xs:group ref="latLonGroup" minOccurs="0"/>
        <xs:element name="elev" type="float" minOccurs="0"/>
        <xs:element name="permInst" type="string255" minOccurs="0"/>
        <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="diffUTC" type="float" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- Meteo instrument -->
        <xs:element name="MeteoInstrument" type="MeteoInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo instruments -->
<xs:complexType name="MeteoInstrumentsType">
  <xs:sequence>
        <!-- Meteo instrument -->
        <xs:element name="MeteoInstrument" type="MeteoInstrumentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Meteo instrument alone -->
<xs:complexType name="MeteoInstrumentAloneType">
  <xs:sequence>
        <xs:element name="name" type="string255" minOccurs="0"/>
        <xs:element name="type" type="string50" minOccurs="0"/>
        <xs:element name="units" type="string50" minOccurs="0"/>
        <xs:element name="resolution" type="float" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
```

```
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic network -->
<xs:complexType name="SeismicNetworkType">
  <xs:sequence>
        <xs:element name="Volcanoes" type="VolcanoesType" minOccurs="0"/>
        <xs:element name="name" type="string30" minOccurs="0"/>
        <xs:element name="velocityModel" type="string511" minOccurs="0"/>
        <xs:element name="velocityModelDetail" type="string511" minOccurs="0"/>
        <xs:element name="zeroDepth" type="string255" minOccurs="0"/>
        <xs:element name="fixedDepth" type="yesNoUnkEnum" minOccurs="0"/>
        <xs:element name="fixedDepthDesc" type="string255" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="numberOfSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfBBSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfSMPSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfDigiSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfAnaSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOf3CompSeismo" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfMicro" type="xs:integer" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="diffUTC" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- Seismic station -->
        <xs:element name="SeismicStation" type="SeismicStationType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic station -->
<xs:complexType name="SeismicStationType">
  <xs:sequence>
        <xs:element name="name" type="string30" minOccurs="0"/>
        <xs:group ref="latLonGroup" minOccurs="0"/>
        <xs:element name="elev" type="float" minOccurs="0"/>
        <xs:element name="instDepth" type="string255" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="diffUTC" type="float" minOccurs="0"/>
        <xs:element name="instType" type="string255" minOccurs="0"/>
        <xs:element name="systemGain" type="float" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>

        <!-- Seismic instrument -->
        <xs:element name="SeismicInstrument" type="SeismicInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic stations -->
<xs:complexType name="SeismicStationsType">
  <xs:sequence>
```

```
            <!-- Seismic station alone -->
            <xs:element name="SeismicStation" type="SeismicStationAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic station alone -->
<xs:complexType name="SeismicStationAloneType">
  <xs:sequence>
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="instDepth" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="instType" type="string255" minOccurs="0"/>
            <xs:element name="systemGain" type="float" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Seismic instrument -->
            <xs:element name="SeismicInstrument" type="SeismicInstrumentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic instrument -->
<xs:complexType name="SeismicInstrumentType">
  <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="dynamicRange" type="string255" minOccurs="0"/>
            <xs:element name="gain" type="float" minOccurs="0"/>
            <xs:element name="filters" type="string255" minOccurs="0"/>
            <xs:element name="numberOfComp" type="xs:integer" minOccurs="0"/>
            <xs:element name="respOverview" type="string255" minOccurs="0"/>
            <xs:element name="respFile" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Seismic component -->
            <xs:element name="SeismicComponent" type="SeismicComponentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic instruments -->
<xs:complexType name="SeismicInstrumentsType">
  <xs:sequence>
            <!-- Seismic instrument alone -->
            <xs:element name="SeismicInstrument" type="SeismicInstrumentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
```

```
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic instrument alone -->
<xs:complexType name="SeismicInstrumentAloneType">
  <xs:sequence>
        <xs:element name="name" type="string255" minOccurs="0"/>
        <xs:element name="type" type="string255" minOccurs="0"/>
        <xs:element name="dynamicRange" type="string255" minOccurs="0"/>
        <xs:element name="gain" type="float" minOccurs="0"/>
        <xs:element name="filters" type="string255" minOccurs="0"/>
        <xs:element name="numberOfComp" type="xs:integer" minOccurs="0"/>
        <xs:element name="respOverview" type="string255" minOccurs="0"/>
        <xs:element name="respFile" type="string255" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime"/>
        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- Seismic component -->
        <xs:element name="SeismicComponent" type="SeismicComponentType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic component -->
<xs:complexType name="SeismicComponentType">
  <xs:sequence>
        <xs:element name="name" type="string255" minOccurs="0"/>
        <xs:element name="type" type="string255" minOccurs="0"/>
        <xs:element name="respDesc" type="string255" minOccurs="0"/>
        <xs:element name="seedBandCode" type="string30" minOccurs="0"/>
        <xs:element name="sampleRate" type="float" minOccurs="0"/>
        <xs:element name="seedInstCode" type="string30" minOccurs="0"/>
        <xs:element name="seedOrientCode" type="string30" minOccurs="0"/>
        <xs:element name="sensitivity" type="string255" minOccurs="0"/>
        <xs:element name="depth" type="float" minOccurs="0"/>
        <xs:element name="startTime" type="dateTime"/>
        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic components -->
<xs:complexType name="SeismicComponentsType">
  <xs:sequence>
        <!-- Seismic component -->
        <xs:element name="SeismicComponent" type="SeismicComponentAloneType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Seismic component alone -->
<xs:complexType name="SeismicComponentAloneType">
  <xs:sequence>
        <xs:element name="name" type="string255" minOccurs="0"/>
```

```
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="respDesc" type="string255" minOccurs="0"/>
            <xs:element name="seedBandCode" type="string30" minOccurs="0"/>
            <xs:element name="sampleRate" type="float" minOccurs="0"/>
            <xs:element name="seedInstCode" type="string30" minOccurs="0"/>
            <xs:element name="seedOrientCode" type="string30" minOccurs="0"/>
            <xs:element name="sensitivity" type="string255" minOccurs="0"/>
            <xs:element name="depth" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Volcanoes list -->
<xs:complexType name="VolcanoesType">
  <xs:sequence>
            <xs:element name="volcanoCode" maxOccurs="unbounded">
                  <xs:complexType>
                        <xs:simpleContent>
                              <xs:extension base="string30">
                                    <xs:attribute name="number" type="xs:integer"/>
                              </xs:extension>
                        </xs:simpleContent>
                  </xs:complexType>
            </xs:element>
  </xs:sequence>
</xs:complexType>

<!-- Volcano code -->
<xs:complexType name="VolcanoCodeType">
  <xs:sequence>
            <xs:element name="volcanoCode" type="string30" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- Data -->
<xs:complexType name="DataType">
  <xs:sequence>
            <!-- Deformation -->
            <xs:element name="Deformation" type="DeformationType" minOccurs="0"/>
            <!-- Gas -->
            <xs:element name="Gas" type="GasType" minOccurs="0"/>
            <!-- Hydrologic -->
            <xs:element name="Hydrologic" type="HydrologicType" minOccurs="0"/>
            <!-- Fields -->
            <xs:element name="Fields" type="FieldsType" minOccurs="0"/>
            <!-- Thermal -->
            <xs:element name="Thermal" type="ThermalType" minOccurs="0"/>
            <!-- Meteo -->
            <xs:element name="Meteo" type="MeteoType" minOccurs="0"/>
            <!-- Seismic -->
            <xs:element name="Seismic" type="SeismicType" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

<!-- Deformation -->
<xs:complexType name="DeformationType">
  <xs:sequence>
```

```
            <!-- Electronic tilt dataset -->
            <xs:element name="ElectronicTiltDataset" type="ElectronicTiltDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Tilt vector dataset -->
            <xs:element name="TiltVectorDataset" type="TiltVectorDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Strain dataset -->
            <xs:element name="StrainDataset" type="StrainDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- EDM dataset -->
            <xs:element name="EDMDataset" type="EDMDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Angle dataset -->
            <xs:element name="AngleDataset" type="AngleDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- GPS dataset -->
            <xs:element name="GPSDataset" type="GPSDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- GPS vector dataset -->
            <xs:element name="GPSVectorDataset" type="GPSVectorDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Leveling dataset -->
            <xs:element name="LevelingDataset" type="LevelingDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- InSAR image dataset -->
            <xs:element name="InSARImageDataset" type="InSARImageDatasetType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electronic tilt dataset -->
<xs:complexType name="ElectronicTiltDatasetType">
  <xs:sequence>
            <!-- Electronic tilt -->
            <xs:element name="ElectronicTilt" type="ElectronicTiltType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electronic tilt -->
<xs:complexType name="ElectronicTiltType">
  <xs:sequence>
            <xs:element name="measTime" type="dateTimemsec"/>
            <xs:element name="measTimeCsec" type="decimal" minOccurs="0"/>
            <xs:element name="measTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
            <xs:element name="measTimeCsecUnc" type="decimal" minOccurs="0"/>
            <xs:element name="sampleRate" type="double" minOccurs="0"/>
            <xs:element name="tilt1" type="double" minOccurs="0"/>
            <xs:element name="tilt2" type="double" minOccurs="0"/>
            <xs:element name="tilt1Unc" type="double" minOccurs="0"/>
            <xs:element name="tilt2Unc" type="double" minOccurs="0"/>
            <xs:element name="processed" type="processedEnum" minOccurs="0"/>
            <xs:element name="temperature" type="double" minOccurs="0"/>
            <xs:element name="battery" type="double" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tilt vector dataset -->
<xs:complexType name="TiltVectorDatasetType">
  <xs:sequence>
            <!-- Tilt vector -->
            <xs:element name="TiltVector" type="TiltVectorType" maxOccurs="unbounded"/>
  </xs:sequence>
```

```
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tilt vector -->
<xs:complexType name="TiltVectorType">
    <xs:sequence>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="magnitude" type="float" minOccurs="0"/>
                <xs:element name="azimuth" type="deg0-360" minOccurs="0"/>
                <xs:element name="magnitudeUnc" type="float" minOccurs="0"/>
                <xs:element name="azimuthUnc" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Strain dataset -->
<xs:complexType name="StrainDatasetType">
    <xs:sequence>
                <!-- Strain -->
                <xs:element name="Strain" type="StrainType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Strain -->
<xs:complexType name="StrainType">
    <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="component1" type="double" minOccurs="0"/>
                <xs:element name="component2" type="double" minOccurs="0"/>
                <xs:element name="component3" type="double" minOccurs="0"/>
                <xs:element name="component4" type="double" minOccurs="0"/>
                <xs:element name="component1Unc" type="double" minOccurs="0"/>
                <xs:element name="component2Unc" type="double" minOccurs="0"/>
                <xs:element name="component3Unc" type="double" minOccurs="0"/>
                <xs:element name="component4Unc" type="double" minOccurs="0"/>
                <xs:element name="volumetricStrain" type="double" minOccurs="0"/>
                <xs:element name="volumetricStrainUnc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis1" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis1" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis2" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis2" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis3" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis3" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis1Unc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis2Unc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis3Unc" type="double" minOccurs="0"/>
                <xs:element name="maxPrincipalStrain" type="double" minOccurs="0"/>
                <xs:element name="maxPrincipalStrainUnc" type="double" minOccurs="0"/>
                <xs:element name="minPrincipalStrain" type="double" minOccurs="0"/>
```

```
            <xs:element name="minPrincipalStrainUnc" type="double" minOccurs="0"/>
            <xs:element name="maxPrincipalStrainDir" type="deg0-360" minOccurs="0"/>
            <xs:element name="maxPrincipalStrainDirUnc" type="float" minOccurs="0"/>
            <xs:element name="minPrincipalStrainDir" type="deg0-360" minOccurs="0"/>
            <xs:element name="minPrincipalStrainDirUnc" type="float" minOccurs="0"/>
            <xs:element name="barPress" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- EDM dataset -->
<xs:complexType name="EDMDatasetType">
  <xs:sequence>
            <!-- EDM -->
            <xs:element name="EDM" type="EDMType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="targetStation" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- EDM -->
<xs:complexType name="EDMType">
  <xs:sequence>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="lineLength" type="double" minOccurs="0"/>
            <xs:element name="constantErr" type="float" minOccurs="0"/>
            <xs:element name="scaleErr" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="targetStation" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Angle dataset -->
<xs:complexType name="AngleDatasetType">
  <xs:sequence>
            <!-- Angle -->
            <xs:element name="Angle" type="AngleType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="targetStation1" type="string30NE"/>
  <xs:attribute name="targetStation2" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Angle -->
<xs:complexType name="AngleType">
  <xs:sequence>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
```

```
            <xs:element name="hAngle1" type="deg0-360" minOccurs="0"/>
            <xs:element name="hAngle2" type="deg0-360" minOccurs="0"/>
            <xs:element name="vAngle1" type="deg-90-90" minOccurs="0"/>
            <xs:element name="vAngle2" type="deg-90-90" minOccurs="0"/>
            <xs:element name="hAngle1Unc" type="float" minOccurs="0"/>
            <xs:element name="hAngle2Unc" type="float" minOccurs="0"/>
            <xs:element name="vAngle1Unc" type="float" minOccurs="0"/>
            <xs:element name="vAngle2Unc" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="targetStation1" type="string30NE"/>
  <xs:attribute name="targetStation2" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS dataset -->
<xs:complexType name="GPSDatasetType">
  <xs:sequence>
            <!-- GPS -->
            <xs:element name="GPS" type="GPSType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="refStation1" type="string30NE"/>
  <xs:attribute name="refStation2" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS -->
<xs:complexType name="GPSType">
  <xs:sequence>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="double" minOccurs="0"/>
            <xs:element name="N-SErr" type="double" minOccurs="0"/>
            <xs:element name="E-WErr" type="double" minOccurs="0"/>
            <xs:element name="verticalErr" type="float" minOccurs="0"/>
            <xs:element name="software" type="string50" minOccurs="0"/>
            <xs:element name="orbits" type="string255" minOccurs="0"/>
            <xs:element name="duration" type="string255" minOccurs="0"/>
            <xs:element name="quality" type="qualityEnum" minOccurs="0"/>
            <xs:element name="slope" type="float" minOccurs="0"/>
            <xs:element name="errSlope" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="refStation1" type="string30NE"/>
  <xs:attribute name="refStation2" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS vector dataset -->
<xs:complexType name="GPSVectorDatasetType">
  <xs:sequence>
            <!-- GPS vector -->
```

```
            <xs:element name="GPSVector" type="GPSVectorType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS vector -->
<xs:complexType name="GPSVectorType">
    <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="magnitude" type="float" minOccurs="0"/>
            <xs:element name="azimuth" type="deg0-360" minOccurs="0"/>
            <xs:element name="inclination" type="deg0-90" minOccurs="0"/>
            <xs:element name="northDispl" type="float" minOccurs="0"/>
            <xs:element name="eastDispl" type="float" minOccurs="0"/>
            <xs:element name="vertDispl" type="float" minOccurs="0"/>
            <xs:element name="magnitudeErr" type="float" minOccurs="0"/>
            <xs:element name="northDisplErr" type="float" minOccurs="0"/>
            <xs:element name="eastDisplErr" type="float" minOccurs="0"/>
            <xs:element name="vertDisplErr" type="float" minOccurs="0"/>
            <xs:element name="refFrame" type="string30" minOccurs="0"/>
            <xs:element name="projection" type="string30"  minOccurs="0"/>
            <xs:element name="ellipsoid" type="string30"  minOccurs="0"/>
            <xs:element name="datum" type="string30" minOccurs="0"/>
            <xs:element name="refPosLat" type="float" minOccurs="0"/>
            <xs:element name="refPosLon" type="float" minOccurs="0"/>
            <xs:element name="refPosElev" type="float" minOccurs="0"/>
            <xs:element name="staVelNorth" type="float" minOccurs="0"/>
            <xs:element name="staVelNorthErr" type="float" minOccurs="0"/>
            <xs:element name="staVelEast" type="float" minOccurs="0"/>
            <xs:element name="staVelEastErr" type="float" minOccurs="0"/>
            <xs:element name="staVelVert" type="float" minOccurs="0"/>
            <xs:element name="staVelVertErr" type="float" minOccurs="0"/>
            <xs:element name="gpvDataType" type="string255" minOccurs="0"/>
            <xs:element name="gpvArchive" type="string255" minOccurs="0"/>
            <xs:element name="gpvSoftware" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Leveling dataset -->
<xs:complexType name="LevelingDatasetType">
    <xs:sequence>
            <!-- Leveling -->
            <xs:element name="Leveling" type="LevelingType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="refStation" type="string30NE"/>
    <xs:attribute name="firstBMStation" type="string30NE"/>
    <xs:attribute name="secondBMStation" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Leveling -->
```

```
<xs:complexType name="LevelingType">
  <xs:sequence>
        <xs:element name="order" type="xs:integer" minOccurs="0"/>
        <xs:element name="class" type="string30" minOccurs="0"/>
        <xs:element name="measTime" type="dateTime"/>
        <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="elevChange" type="float" minOccurs="0"/>
        <xs:element name="elevChangeUnc" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="refStation" type="string30NE"/>
  <xs:attribute name="firstBMStation" type="string30NE"/>
  <xs:attribute name="secondBMStation" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- InSAR image dataset -->
<xs:complexType name="InSARImageDatasetType">
  <xs:sequence>
        <!-- InSAR image -->
        <xs:element name="InSARImage" type="InSARImageType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="satellite" type="string30NE"/>
  <xs:attribute name="volcano" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- InSAR image -->
<xs:complexType name="InSARImageType">
  <xs:sequence>
        <xs:group ref="startLatLonGroup" minOccurs="0"/>
        <xs:element name="startPosition" type="startPositionEnum" minOccurs="0"/>
        <xs:element name="rowOrder" type="string30" minOccurs="0"/>
        <xs:element name="numbOfRows" type="xs:integer" minOccurs="0"/>
        <xs:element name="numbOfCols" type="xs:integer" minOccurs="0"/>
        <xs:element name="units" type="string30" minOccurs="0"/>
        <xs:element name="nullValue" type="string30" minOccurs="0"/>
        <xs:element name="location" type="string255" minOccurs="0"/>
        <xs:element name="pair" type="pairStackedEnum" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="DEM" type="string50" minOccurs="0"/>
        <xs:element name="bytesOrder" type="string30" minOccurs="0"/>
        <xs:element name="img1Time" type="dateTime"/>
        <xs:element name="img1TimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="img2Time" type="dateTime"/>
        <xs:element name="img2TimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="metersPixelSize" type="float" minOccurs="0"/>
        <xs:element name="degreesPixelSize" type="float" minOccurs="0"/>
        <xs:element name="lookAngle" type="float" minOccurs="0"/>
        <xs:element name="limb" type="limbEnum" minOccurs="0"/>
        <xs:element name="imagepath" type="string255" minOccurs="0"/>
        <xs:element name="geotiff" type="string255" minOccurs="0"/>
        <xs:element name="processMethod" type="string255" minOccurs="0"/>
        <xs:element name="software" type="string255" minOccurs="0"/>
        <xs:element name="DEMQuality" type="DEMQualityEnum" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- InSAR image pixels -->
        <xs:element name="InSARPixels" type="InSARPixelsType" minOccurs="0"/>
```

```
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="satellite" type="string30NE"/>
  <xs:attribute name="volcano" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- InSAR pixels -->
<xs:complexType name="InSARPixelsType">
  <xs:sequence>
        <!-- InSAR image pixel -->
        <xs:element name="InSARPixel" type="InSARPixelType" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- InSAR pixel -->
<xs:complexType name="InSARPixelType">
  <xs:sequence>
        <xs:element name="rangeOfChange" type="float"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="number" type="xs:integer" use="required"/>
</xs:complexType>

<!-- Gas -->
<xs:complexType name="GasType">
  <xs:sequence>
        <!-- Gas sample dataset -->
        <xs:element name="GasSampleDataset" type="GasSampleDatasetType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Soil efflux dataset -->
        <xs:element name="SoilEffluxDataset" type="SoilEffluxDatasetType" minOccurs="0" maxOccurs="unbounded"/>
        <!-- Plume dataset -->
        <xs:element name="PlumeDataset" type="PlumeDatasetType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas sample dataset -->
<xs:complexType name="GasSampleDatasetType">
  <xs:sequence>
        <!-- Gas sample -->
        <xs:element name="GasSample" type="GasSampleType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas sample -->
<xs:complexType name="GasSampleType">
  <xs:sequence>
        <!-- Gas species -->
        <xs:element name="GasSpecies" type="GasSpeciesType" maxOccurs="unbounded"/>
        <xs:element name="measTime" type="dateTime"/>
        <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="temperature" type="float" minOccurs="0"/>
        <xs:element name="atmosPress" type="float" minOccurs="0"/>
        <xs:element name="emissionRate" type="float" minOccurs="0"/>
        <xs:element name="environFactors" type="string255" minOccurs="0"/>
        <xs:element name="sublimateMinerals" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
```

```
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas species -->
<xs:complexType name="GasSpeciesType">
  <xs:sequence>
        <xs:element name="concentration" type="float" minOccurs="0"/>
        <xs:element name="concentrationUnc" type="float" minOccurs="0"/>
        <xs:element name="units" type="string30" minOccurs="0"/>
        <xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="type" type="gasSpeciesEnum" use="required"/>
  <xs:attribute name="waterFree" type="yesNoEnum" use="required"/>
</xs:complexType>

<!-- Soil efflux dataset -->
<xs:complexType name="SoilEffluxDatasetType">
  <xs:sequence>
        <!-- Gas sample -->
        <xs:element name="SoilEfflux" type="SoilEffluxType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Soil efflux -->
<xs:complexType name="SoilEffluxType">
  <xs:sequence>
        <xs:element name="measTime" type="dateTime"/>
        <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
  <!--<xs:element name="species" type="string30" minOccurs="0"/>-->
        <xs:element name="species" type="gasSpeciesEnum" maxOccurs="unbounded"/>
        <xs:element name="totalFlux" type="float" minOccurs="0"/>
        <xs:element name="totalFluxUnc" type="float" minOccurs="0"/>
        <xs:element name="numberOfPoints" type="xs:integer" minOccurs="0"/>
        <xs:element name="area" type="float" minOccurs="0"/>
        <xs:element name="highestFlux" type="float" minOccurs="0"/>
        <xs:element name="highestTemp" type="float" minOccurs="0"/>
        <xs:element name="reportedUnits" type="string30" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Plume dataset -->
<xs:complexType name="PlumeDatasetType">
  <xs:sequence>
        <!-- Plume -->
        <xs:element name="Plume" type="PlumeType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="airplane" type="string30NE"/>
```

```
    <xs:attribute name="satellite" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
  </xs:complexType>

  <!-- Plume -->
  <xs:complexType name="PlumeType">
    <xs:sequence>
        <!-- Plume species -->
        <xs:element name="PlumeSpecies" type="PlumeSpeciesType" maxOccurs="unbounded"/>
        <xs:group ref="latLonGroup" minOccurs="0"/>
        <xs:element name="height" type="float" minOccurs="0"/>
        <xs:element name="heightDetermination" type="string255" minOccurs="0"/>
        <xs:element name="measTime" type="dateTime"/>
        <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="windSpeed" type="float" minOccurs="0"/>
        <xs:element name="minWindSpeed" type="float" minOccurs="0"/>
        <xs:element name="maxWindSpeed" type="float" minOccurs="0"/>
        <xs:element name="windDirection" type="string30" minOccurs="0"/>
        <xs:element name="weatherNotes" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="volcano" type="string12NE"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="airplane" type="string30NE"/>
    <xs:attribute name="satellite" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
  </xs:complexType>

  <!-- Plume species -->
  <xs:complexType name="PlumeSpeciesType">
    <xs:sequence>
        <xs:element name="emissionRate" type="float" minOccurs="0"/>
        <xs:element name="emissionRateUnc" type="float" minOccurs="0"/>
        <xs:element name="units" type="string30" minOccurs="0"/>
        <xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="type" type="plumeSpeciesEnum" use="required"/>
  </xs:complexType>

  <!-- Hydrologic -->
  <xs:complexType name="HydrologicType">
    <xs:sequence>
        <!-- Hydrologic sample dataset -->
        <xs:element name="HydrologicSampleDataset" type="HydrologicSampleDatasetType" minOccurs="0" maxOccurs="un-
bounded"/>
    </xs:sequence>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
  </xs:complexType>

  <!-- Hydrologic sample dataset -->
  <xs:complexType name="HydrologicSampleDatasetType">
    <xs:sequence>
        <!-- Hydrologic sample -->
        <xs:element name="HydrologicSample" type="HydrologicSampleType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
  </xs:complexType>
```

```
<!-- Hydrologic sample -->
<xs:complexType name="HydrologicSampleType">
  <xs:sequence>
    <!-- Hydrologic species -->
    <xs:element name="HydrologicSpecies" type="HydrologicSpeciesType" maxOccurs="unbounded"/>
    <xs:element name="measTime" type="dateTime"/>
    <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
    <xs:element name="temperature" type="float" minOccurs="0"/>
    <xs:element name="elev" type="double" minOccurs="0"/>
    <xs:element name="depth" type="double" minOccurs="0"/>
    <xs:element name="waterLevelChange" type="double" minOccurs="0"/>
    <xs:element name="atmosPress" type="float" minOccurs="0"/>
    <xs:element name="springDischRate" type="double" minOccurs="0"/>
    <xs:element name="precipitation" type="float" minOccurs="0"/>
    <xs:element name="dailyPrecipitation" type="float" minOccurs="0"/>
    <xs:element name="precipitationType" type="precipitationTypeEnum" minOccurs="0"/>
    <xs:element name="pH" type="float" minOccurs="0"/>
    <xs:element name="pHUnc" type="float" minOccurs="0"/>
    <xs:element name="conductivity" type="float" minOccurs="0"/>
    <xs:element name="conductivityUnc" type="float" minOccurs="0"/>
    <xs:element name="airTemp" type="float" minOccurs="0"/>
    <xs:element name="totalDisolvedSolid" type="float" minOccurs="0"/>
    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
    <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Hydrologic species -->
<xs:complexType name="HydrologicSpeciesType">
  <xs:sequence>
    <xs:element name="content" type="float" minOccurs="0"/>
    <xs:element name="contentUnc" type="float" minOccurs="0"/>
    <xs:element name="units" type="string30" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="type" type="hydroSpeciesEnum" use="required"/>
</xs:complexType>

<!-- Fields -->
<xs:complexType name="FieldsType">
  <xs:sequence>
    <!-- Magnetic dataset -->
    <xs:element name="MagneticDataset" type="MagneticDatasetType" minOccurs="0" maxOccurs="unbounded"/>
    <!-- Magnetic vector dataset -->
    <xs:element name="MagneticVectorDataset" type="MagneticVectorDatasetType" minOccurs="0" maxOccurs="unboun-
ded"/>
    <!-- Electric dataset -->
    <xs:element name="ElectricDataset" type="ElectricDatasetType" minOccurs="0" maxOccurs="unbounded"/>
    <!-- Gravity dataset -->
    <xs:element name="GravityDataset" type="GravityDatasetType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- Magnetic dataset -->
<xs:complexType name="MagneticDatasetType">
  <xs:sequence>
    <!-- Magnetic -->
    <xs:element name="Magnetic" type="MagneticType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="instrument" type="string30NE"/>
```

```
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="refStation" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Magnetic -->
<xs:complexType name="MagneticType">
    <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="F" type="double" minOccurs="0"/>
                <xs:element name="X" type="double" minOccurs="0"/>
                <xs:element name="Y" type="double" minOccurs="0"/>
                <xs:element name="Z" type="double" minOccurs="0"/>
                <xs:element name="FUnc" type="float" minOccurs="0"/>
                <xs:element name="XUnc" type="float" minOccurs="0"/>
                <xs:element name="YUnc" type="float" minOccurs="0"/>
                <xs:element name="ZUnc" type="float" minOccurs="0"/>
                <xs:element name="highPass" type="float" minOccurs="0"/>
                <xs:element name="lowPass" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="refStation" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Magnetic vector dataset -->
<xs:complexType name="MagneticVectorDatasetType">
    <xs:sequence>
                <!-- Magnetic vector -->
                <xs:element name="MagneticVector" type="MagneticVectorType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Magnetic vector -->
<xs:complexType name="MagneticVectorType">
    <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="declination" type="deg0-360" minOccurs="0"/>
                <xs:element name="inclination" type="deg0-90" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electric dataset -->
<xs:complexType name="ElectricDatasetType">
    <xs:sequence>
                <!-- Electric -->
                <xs:element name="Electric" type="ElectricType" maxOccurs="unbounded"/>
    </xs:sequence>
```

```
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="refStation1" type="string30NE"/>
    <xs:attribute name="refStation2" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electric -->
<xs:complexType name="ElectricType">
    <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="field" type="float" minOccurs="0"/>
                <xs:element name="fieldUnc" type="float" minOccurs="0"/>
                <xs:element name="direction" type="deg0-360" minOccurs="0"/>
                <xs:element name="highPass" type="float" minOccurs="0"/>
                <xs:element name="lowPass" type="float" minOccurs="0"/>
                <xs:element name="selfPotential" type="float" minOccurs="0"/>
                <xs:element name="selfPotentialUnc" type="float" minOccurs="0"/>
                <xs:element name="apparentResistivity" type="float" minOccurs="0"/>
                <xs:element name="apparentResistivityUnc" type="float" minOccurs="0"/>
                <xs:element name="directResistivity" type="float" minOccurs="0"/>
                <xs:element name="directResistivityUnc" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="refStation1" type="string30NE"/>
    <xs:attribute name="refStation2" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gravity dataset -->
<xs:complexType name="GravityDatasetType">
    <xs:sequence>
                <!-- Gravity -->
                <xs:element name="Gravity" type="GravityType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="refStation1" type="string30NE"/>
    <xs:attribute name="refStation2" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gravity -->
<xs:complexType name="GravityType">
    <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="fieldStrength" type="double" minOccurs="0"/>
                <xs:element name="fieldStrengthUnc" type="double" minOccurs="0"/>
                <xs:element name="assocVertDispl" type="string255" minOccurs="0"/>
                <xs:element name="assocGWaterLevel" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="instrument" type="string30NE"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="refStation" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>
```

```
        <!-- Thermal -->
        <xs:complexType name="ThermalType">
          <xs:sequence>
                    <!-- Ground-based dataset -->
                    <xs:element name="Ground-basedDataset" type="GroundBasedDatasetType" minOccurs="0" maxOc-
curs="unbounded"/>
                    <!-- Thermal image dataset -->
                    <xs:element name="ThermalImageDataset" type="ThermalImageDatasetType" minOccurs="0" maxOccurs="unboun-
ded"/>
          </xs:sequence>
        </xs:complexType>

        <!-- Ground-based dataset -->
        <xs:complexType name="GroundBasedDatasetType">
          <xs:sequence>
                    <!-- Ground-based -->
                    <xs:element name="Ground-based" type="GroundBasedType" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="instrument" type="string30NE"/>
          <xs:attribute name="station" type="string30NE"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Ground-based -->
        <xs:complexType name="GroundBasedType">
          <xs:sequence>
                    <xs:element name="measType" type="string255" minOccurs="0"/>
                    <xs:element name="measTime" type="dateTime"/>
                    <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="measDepth" type="float" minOccurs="0"/>
                    <xs:element name="distance" type="float" minOccurs="0"/>
                    <xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>
                    <xs:element name="temperature" type="float" minOccurs="0"/>
                    <xs:element name="temperatureUnc" type="float" minOccurs="0"/>
                    <xs:element name="area" type="float" minOccurs="0"/>
                    <xs:element name="heatFlux" type="float" minOccurs="0"/>
                    <xs:element name="heatFluxUnc" type="float" minOccurs="0"/>
                    <xs:element name="bgGeothermGradient" type="float" minOccurs="0"/>
                    <xs:element name="conductivity" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
          </xs:sequence>
          <xs:attribute name="code" type="string30NE" use="required"/>
          <xs:attribute name="instrument" type="string30NE"/>
          <xs:attribute name="station" type="string30NE"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Thermal image dataset -->
        <xs:complexType name="ThermalImageDatasetType">
          <xs:sequence>
                    <!-- Thermal image -->
                    <xs:element name="ThermalImage" type="ThermalImageType" maxOccurs="unbounded"/>
          </xs:sequence>
          <xs:attribute name="volcano" type="string12NE"/>
          <xs:attribute name="instrument" type="string30NE"/>
          <xs:attribute name="station" type="string30NE"/>
          <xs:attribute name="airplane" type="string30NE"/>
          <xs:attribute name="satellite" type="string30NE"/>
          <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Thermal image -->
```

```
<xs:complexType name="ThermalImageType">
  <xs:sequence>
        <xs:element name="instPlatform" type="string255" minOccurs="0"/>
        <xs:element name="instAlt" type="float" minOccurs="0"/>
        <xs:group ref="instLatLonGroup" minOccurs="0"/>
        <xs:element name="datum" type="string30" minOccurs="0"/>
        <xs:element name="description" type="string255" minOccurs="0"/>
        <xs:element name="time" type="dateTime"/>
        <xs:element name="timeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="bandName" type="string255" minOccurs="0"/>
        <xs:element name="highBandWavelength" type="float" minOccurs="0"/>
        <xs:element name="lowBandWavelength" type="float" minOccurs="0"/>
        <xs:element name="imagepath" type="string255" minOccurs="0"/>
        <xs:element name="pixelSize" type="float" minOccurs="0"/>
        <xs:element name="maxRadiance" type="float" minOccurs="0"/>
        <xs:element name="maxRelativeRadiance" type="float" minOccurs="0"/>
        <xs:element name="hottestPixelTemp" type="float" minOccurs="0"/>
        <xs:element name="totRadiance" type="float" minOccurs="0"/>
        <xs:element name="maxHeatFlux" type="float" minOccurs="0"/>
        <xs:element name="nominalTempRes" type="float" minOccurs="0"/>
        <xs:element name="atmosCorrection" type="string255" minOccurs="0"/>
        <xs:element name="thermCorrection" type="string255" minOccurs="0"/>
        <xs:element name="orthorecProc" type="string255" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
        <!-- Thermal image pixels -->
        <xs:element name="ThermalPixels" type="ThermalPixelsType" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attribute name="instrument" type="string30NE"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attribute name="satellite" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Thermal pixels -->
<xs:complexType name="ThermalPixelsType">
  <xs:sequence>
        <!-- Thermal image pixel -->
        <xs:element name="ThermalPixel" type="ThermalPixelType" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- Thermal pixel -->
<xs:complexType name="ThermalPixelType">
  <xs:sequence>
        <xs:element name="elev" type="float" minOccurs="0"/>
        <xs:group ref="latLonGroup"/>
        <xs:element name="radiance" type="float" minOccurs="0"/>
        <xs:element name="heatFlux" type="float" minOccurs="0"/>
        <xs:element name="temperature" type="float" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

<!-- Meteo -->
<xs:complexType name="MeteoType">
  <xs:sequence>
        <!-- Meteo dataset -->
        <xs:element name="MeteoDataset" type="MeteoDatasetType" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
```

```
    </xs:complexType>


    <!-- Meteo dataset -->
    <xs:complexType name="MeteoDatasetType">
      <xs:sequence>
            <!-- Meteo -->
            <xs:element name="MeteoData" type="MeteoDataType" maxOccurs="unbounded"/>
      </xs:sequence>
      <xs:attribute name="instrument" type="string30NE"/>
      <xs:attribute name="station" type="string30NE"/>
      <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo -->
    <xs:complexType name="MeteoDataType">
      <xs:sequence>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="airTemp" type="float" minOccurs="0"/>
            <xs:element name="soilTemp" type="float" minOccurs="0"/>
            <xs:element name="baroPress" type="float" minOccurs="0"/>
            <xs:element name="dailyPrecipitation" type="float" minOccurs="0"/>
            <xs:element name="precipitationType" type="precipitationTypeEnum" minOccurs="0"/>
            <xs:element name="humidity" type="float" minOccurs="0"/>
            <xs:element name="windSpeed" type="float" minOccurs="0"/>
            <xs:element name="minWindSpeed" type="float" minOccurs="0"/>
            <xs:element name="maxWindSpeed" type="float" minOccurs="0"/>
            <xs:element name="windDirection" type="string30" minOccurs="0"/>
            <xs:element name="cloudCoverage" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
      </xs:sequence>
      <xs:attribute name="code" type="string30NE" use="required"/>
      <xs:attribute name="instrument" type="string30NE"/>
      <xs:attribute name="station" type="string30NE"/>
      <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic -->
    <xs:complexType name="SeismicType">
      <xs:sequence>
            <!-- Network event dataset -->
            <xs:element name="NetworkEventDataset" type="NetworkEventDatasetType" minOccurs="0" maxOc-
curs="unbounded"/>
            <!-- Single station event dataset -->
            <xs:element name="SingleStationEventDataset" type="SingleStationEventDatasetType" minOccurs="0" maxOc-
curs="unbounded"/>
            <!-- Intensity dataset -->
            <xs:element name="IntensityDataset" type="IntensityDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Tremor dataset -->
            <xs:element name="TremorDataset" type="TremorDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- Interval dataset -->
            <xs:element name="IntervalDataset" type="IntervalDatasetType" minOccurs="0" maxOccurs="unbounded"/>
            <!-- RSAM-SSAM dataset -->
            <xs:element name="RSAM-SSAMDataset" type="RSAM-SSAMDatasetType" minOccurs="0" maxOc-
curs="unbounded"/>
            <!-- WAVEFORM dataset -->
            <xs:element name="WaveformDataset" type="WaveformDatasetType" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>

    <!-- Network event dataset -->
```

```
<xs:complexType name="NetworkEventDatasetType">
  <xs:sequence>
        <!-- Network event -->
        <xs:element name="NetworkEvent" type="NetworkEventType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Network event -->
<xs:complexType name="NetworkEventType">
  <xs:sequence>
        <xs:element name="seismoArchive" type="string255" minOccurs="0"/>
        <xs:element name="originTime" type="dateTimemsec"/>
        <xs:element name="originTimeCsec" type="decimal" minOccurs="0"/>
        <xs:element name="originTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
        <xs:element name="originTimeCsecUnc" type="decimal" minOccurs="0"/>
        <xs:element name="duration" type="float" minOccurs="0"/>
        <xs:element name="durationUnc" type="float" minOccurs="0"/>
        <xs:element name="locaTechnique" type="string255" minOccurs="0"/>
        <xs:element name="picksDetermination" type="picksDeterminationEnum" minOccurs="0"/>
        <xs:group ref="latLonGroup" minOccurs="0"/>
        <xs:element name="depth" type="float" minOccurs="0"/>
        <xs:element name="fixedDepth" type="yesNoUnkEnum" minOccurs="0"/>
        <xs:element name="numberOfStations" type="xs:integer" minOccurs="0"/>
        <xs:element name="numberOfPhases" type="xs:integer" minOccurs="0"/>
        <xs:element name="largestAzimuthGap" type="deg0-360" minOccurs="0"/>
        <xs:element name="distClosestStation" type="float" minOccurs="0"/>
        <xs:element name="travelTimeRMS" type="float" minOccurs="0"/>
        <xs:element name="horizLocaErr" type="float" minOccurs="0"/>
        <xs:element name="maxLonErr" type="xs:float" minOccurs="0"/>
        <xs:element name="maxLatErr" type="xs:float" minOccurs="0"/>
        <xs:element name="depthErr" type="float" minOccurs="0"/>
        <xs:element name="locaQuality" type="string255" minOccurs="0"/>
        <xs:element name="primMagnitude" type="float" minOccurs="0"/>
        <xs:element name="primMagnitudeType" type="string30" minOccurs="0"/>
        <xs:element name="secMagnitude" type="float" minOccurs="0"/>
        <xs:element name="secMagnitudeType" type="string30" minOccurs="0"/>
        <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
        <xs:group ref="momentTensorGroup" minOccurs="0"/>
        <xs:element name="strike1" type="deg0-360" minOccurs="0"/>
        <xs:element name="strike1Unc" type="float" minOccurs="0"/>
        <xs:element name="dip1" type="deg0-90" minOccurs="0"/>
        <xs:element name="dip1Unc" type="float" minOccurs="0"/>
        <xs:element name="rake1" type="deg-180-180" minOccurs="0"/>
        <xs:element name="rake1Unc" type="float" minOccurs="0"/>
        <xs:element name="strike2" type="deg0-360" minOccurs="0"/>
        <xs:element name="strike2Unc" type="float" minOccurs="0"/>
        <xs:element name="dip2" type="deg0-90" minOccurs="0"/>
        <xs:element name="dip2Unc" type="float" minOccurs="0"/>
        <xs:element name="rake2" type="deg-180-180" minOccurs="0"/>
        <xs:element name="rake2Unc" type="float" minOccurs="0"/>
        <xs:element name="focalPlaneSol" type="string255" minOccurs="0"/>
        <xs:element name="sampleRate" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="network" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Single station event dataset -->
```

```
<xs:complexType name="SingleStationEventDatasetType">
  <xs:sequence>
        <!-- Single station event -->
        <xs:element name="SingleStationEvent" type="SingleStationEventType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Single station event -->
<xs:complexType name="SingleStationEventType">
  <xs:sequence>
        <xs:element name="startTime" type="dateTimemsec"/>
        <xs:element name="startTimeCsec" type="decimal" minOccurs="0"/>
        <xs:element name="startTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
        <xs:element name="startTimeCsecUnc" type="decimal" minOccurs="0"/>
        <xs:element name="picksDetermination" type="picksDeterminationEnum" minOccurs="0"/>
        <xs:element name="SPInterval" type="float" minOccurs="0"/>
        <xs:element name="duration" type="float" minOccurs="0"/>
        <xs:element name="durationUnc" type="float" minOccurs="0"/>
        <xs:element name="distActiveVent" type="float" minOccurs="0"/>
        <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
        <xs:element name="sampleRate" type="float" minOccurs="0"/>
        <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
        <xs:element name="domFrequency" type="float" minOccurs="0"/>
        <xs:element name="firstMotion" type="firMotionEnum" minOccurs="0"/>
        <xs:element name="magnitude" type="float" minOccurs="0"/>
        <xs:element name="energy" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Intensity dataset -->
<xs:complexType name="IntensityDatasetType">
  <xs:sequence>
        <!-- Intensity -->
        <xs:element name="Intensity" type="IntensityType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attribute name="networkEvent" type="string30NE"/>
  <xs:attribute name="singleStationEvent" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Intensity -->
<xs:complexType name="IntensityType">
  <xs:sequence>
        <xs:element name="time" type="dateTime"/>
        <xs:element name="timeUnc" type="dateTimeUnc" minOccurs="0"/>
        <xs:element name="city" type="string30" minOccurs="0"/>
        <xs:element name="maxDistance" type="float" minOccurs="0"/>
        <xs:element name="maxReported" type="float" minOccurs="0"/>
        <xs:element name="distMaxReported" type="float" minOccurs="0"/>
        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
        <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="code" type="string30NE" use="required"/>
  <xs:attribute name="volcano" type="string12NE"/>
  <xs:attribute name="networkEvent" type="string30NE"/>
```

```
    <xs:attribute name="singleStationEvent" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tremor dataset -->
<xs:complexType name="TremorDatasetType">
    <xs:sequence>
            <!-- Tremor -->
            <xs:element name="Tremor" type="TremorType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="network" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tremor -->
<xs:complexType name="TremorType">
    <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="durationPerDay" type="float" minOccurs="0"/>
            <xs:element name="durationPerDayUnc" type="float" minOccurs="0"/>
            <xs:element name="type" type="trmTypeEnum" minOccurs="0"/>
            <xs:element name="qualitativeDepth" type="qualitativeDepthEnum" minOccurs="0"/>
            <xs:element name="dominantFreq" type="float" minOccurs="0"/>
            <xs:element name="secondDominantFreq" type="float" minOccurs="0"/>
            <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
            <xs:element name="backgroundNoise" type="float" minOccurs="0"/>
            <xs:element name="reducedDisp" type="float" minOccurs="0"/>
            <xs:element name="reducedDispUnc" type="float" minOccurs="0"/>
            <xs:element name="visibleActivity" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="network" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Interval dataset -->
<xs:complexType name="IntervalDatasetType">
    <xs:sequence>
            <!-- Interval -->
            <xs:element name="Interval" type="IntervalType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="network" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Interval -->
<xs:complexType name="IntervalType">
    <xs:sequence>
            <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="hDistSummit" type="float" minOccurs="0"/>
            <xs:element name="meanDepth" type="float" minOccurs="0"/>
```

```
            <xs:element name="verticalDisp" type="float" minOccurs="0"/>
            <xs:element name="hypocenterHMigr" type="float" minOccurs="0"/>
            <xs:element name="hypocenterVMigr" type="float" minOccurs="0"/>
            <xs:element name="temporalPattern" type="string30" minOccurs="0"/>
            <xs:element name="dataType" type="dataTypeEnum" minOccurs="0"/>
            <xs:element name="picksDetermination" type="picksDeterminationEnum" minOccurs="0"/>
            <xs:element name="feltEqCntStartTime" type="dateTime" minOccurs="0"/>
            <xs:element name="feltEqCntStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="feltEqCntEndTime" type="dateTime" minOccurs="0"/>
            <xs:element name="feltEqCntEndTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="numbOfRecEq" type="xs:integer" minOccurs="0"/>
            <xs:element name="numbOfFeltEq" type="xs:integer" minOccurs="0"/>
            <xs:element name="energyMeasStartTime" type="dateTime" minOccurs="0"/>
            <xs:element name="energyMeasStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="energyMeasEndTime" type="dateTime" minOccurs="0"/>
            <xs:element name="energyMeasEndTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="energyRelease" type="float" minOccurs="0"/>
            <xs:element name="minFrequency" type="float" minOccurs="0"/>
            <xs:element name="maxFrequency" type="float" minOccurs="0"/>
            <xs:element name="minAmplitude" type="float" minOccurs="0"/>
            <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attribute name="network" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- RSAM-SSAM dataset -->
<xs:complexType name="RSAM-SSAMDatasetType">
    <xs:sequence>
            <!-- RSAM-SSAM -->
            <xs:element name="RSAM-SSAM" type="RSAM-SSAMType" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- RSAM-SSAM -->
<xs:complexType name="RSAM-SSAMType">
    <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTime"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="cntInterval" type="float"/>
            <xs:element name="cntIntervalUnc" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <xs:element name="RSAM" type="RSAMType" minOccurs="0"/>
            <xs:element name="SSAM" type="SSAMType" minOccurs="0"/>
    </xs:sequence>
    <xs:attribute name="code" type="string30NE" use="required"/>
    <xs:attribute name="station" type="string30NE"/>
    <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- RSAM -->
<xs:complexType name="RSAMType">
    <xs:sequence>
```

```
            <!-- RSAM data -->
            <xs:element name="RSAMData" type="RSAMDataType" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- RSAM data -->
<xs:complexType name="RSAMDataType">
  <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="cnt" type="float"/>
            <xs:element name="calibration" type="float" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>

<!-- SSAM -->
<xs:complexType name="SSAMType">
  <xs:sequence>
            <!-- SSAM data -->
            <xs:element name="SSAMData" type="SSAMDataType" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<!-- SSAM data -->
<xs:complexType name="SSAMDataType">
  <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="lowFreq" type="float"/>
            <xs:element name="highFreq" type="float"/>
            <xs:element name="cnt" type="float"/>
            <xs:element name="calibration" type="float" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>



<!-- Waveform dataset -->
<xs:complexType name="WaveformDatasetType">
  <xs:sequence>
            <!-- Waveform -->
            <xs:element name="Waveform" type="WaveformType" maxOccurs="unbounded"/>
  </xs:sequence>
  <xs:attribute name="station" type="string30NE"/>
  <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>



<!-- Waveform -->
<xs:complexType name="WaveformType">
  <xs:sequence>
            <xs:element name="archive" type="string30" minOccurs="0"/>
            <xs:element name="link" type="string30" minOccurs="0"/>
            <xs:element name="distSummit" type="wavefromdistanceEnum" minOccurs="0"/>
            <xs:element name="image" type="string30" minOccurs="0"/>
            <xs:element name="information" type="string30" minOccurs="0"/>
            <xs:element name="description" type="string30" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
  </xs:sequence>
```

```
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="networkEvent" type="string30NE"/>
            <xs:attribute name="singleStationEvent" type="string30NE"/>
            <xs:attribute name="tremor" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- ================================================================= -->
        <!-- Root element -->
        <!-- ================================================================= -->
        <xs:element name="wovoml" type="wovomlType"/>

</xs:schema>
```

Appendix-3 MySQL Field Type

MySQL Field Types

MySQL supports a number of column types, which may be grouped into three categories: numeric types, date and time types, and string (character) types. This section first gives an overview of the types available. Please refer to the MySQL manuals for more details.

Type	Use for	Size
TINYINT	A very small integer	The signed range is –128 to 127. The unsigned range is 0 to 255.
SMALLINT	A small integer	The signed range is –32768 to 32767. The unsigned range is 0 to 65535
MEDIUMINT	A medium-size integer	The signed range is –8388608 to 8388607. The unsigned range is 0 to 16777215
INT or INTEGER	A normal-size integer	The signed range is –2147483648 to 2147483647. The unsigned range is 0 to 4294967295
BIGINT	A large integer	The signed range is –9223372036854775808 to 9223372036854775807. The unsigned range is 0 to 18446744073709551615
FLOAT	A small (single-precision) floating-point number. Cannot be unsigned	Ranges are –3.402823466E+38 to –1.175494351E-38, 0 and 1.175494351E-38 to 3.402823466E+38. If the number of Decimals is not set or <= 24 it is a single-precision floating point number
DOUBLE, DOUBLE PRECISION, REAL	A normal-size (double-precision) floating-point number. Cannot be unsigned	Ranges are -1.7976931348623157E+308 to -2.2250738585072014E-308, 0 and 2.2250738585072014E-308 to 1.7976931348623157E+308. If the number of Decimals is not set or 25 <= Decimals <= 53 stands for a double-precision floating point number
DECIMAL, NUMERIC	An unpacked floating-point number. Cannot be unsigned	Behaves like a CHAR column: “unpacked” means the number is stored as a string, using one character for each digit of the value. The decimal point, and, for negative numbers, the ‘-‘ sign is not counted in Length. If Decimals is 0, values will have no decimal point or fractional part. The maximum range of DECIMAL values is the same as for DOUBLE, but the actual range for a given DECIMAL column may be constrained by the choice of Length and Decimals. If Decimals is left out it’s set to 0. If Length is left out it’s set to 10. Note that in MySQL 3.22 the Length includes the sign and the decimal point
DATE	A date	The supported range is ‘1000-01-01’ to ‘9999-12-31’. MySQL displays DATE values in ‘YYYY-MM-DD’ format
DATETIME	A date and time combination	The supported range is ‘1000-01-01 00:00:00’ to ‘9999-12-31 23:59:59’. MySQL displays DATETIME values in ‘YYYY-MM-DD HH:MM:SS’ format
TIMESTAMP	A timestamp	The range is ‘1970-01-01 00:00:00’ to sometime in the year 2037. MySQL displays TIMESTAMP values in YYYYMMDDHHMMSS, YYMMDDHHMMSS, YYYYMMDD or YYMMDD format, depending on whether M is 14 (or missing), 12, 8 or 6, but allows you to assign values to TIMESTAMP columns using either strings or numbers. A TIMESTAMP column is useful for recording the date and time of an INSERT or UPDATE operation because it is automatically set to the date and time of the most recent operation if you don’t give it a value yourself
TIME	A time	The range is ‘-838:59:59’ to ‘838:59:59’. MySQL displays TIME values in ‘HH:MM:SS’ format, but allows you to assign values to TIME columns using either strings or numbers

YEAR	A year in 2- or 4- digit formats (default is 4-digit)	The allowable values are 1901 to 2155, and 0000 in the 4 year format and 1970-2069 if you use the 2 digit format (70-69). MySQL displays YEAR values in YYYY format, but allows you to assign values to YEAR columns using either strings or numbers. (The YEAR type is new in MySQL 3.22.)
CHAR	A fixed-length string that is always right-padded with spaces to the specified length when stored	The range of Length is 1 to 255 characters. Trailing spaces are removed when the value is retrieved. CHAR values are sorted and compared in case-insensitive fashion according to the default character set unless the BINARY keyword is given
VARCHAR	A variable-length string. Note: Trailing spaces are removed when the value is stored (this differs from the ANSI SQL specification)	The range of Length is 1 to 255 characters. VARCHAR values are sorted and compared in case-insensitive fashion unless the BINARY keyword is given
TINYBLOB, TINY-TEXT		A BLOB or TEXT column with a maximum length of 255 (2^8 - 1) characters
BLOB, TEXT		A BLOB or TEXT column with a maximum length of 65535 (2^16 - 1) characters
MEDIUMBLOB, MEDIUMTEXT		A BLOB or TEXT column with a maximum length of 16777215 (2^24 - 1) characters
LONGBLOB, LONGTEXT		A BLOB or TEXT column with a maximum length of 4294967295 (2^32 - 1) characters
ENUM	An enumeration	A string object that can have only one value, chosen from the list of values 'value1', 'value2', ..., or NULL. An ENUM can have a maximum of 65535 distinct values.
SET	A set	A string object that can have zero or more values, each of which must be chosen from the list of values 'value1', 'value2', ... A SET can have a maximum of 64 members

Appendix-4 Earthquake information

Earthquake Classification

There are 21 types of earthquake for WOVOdat (sd_evn_eqtype):

1. VT : volcano-tectonics
2. VT_D : Deep volcano-tectonics
3. VT_S : Shallow volcano-tectonics
4. H : hybrid
5. H_HLF : High- then follow by low frequency Hybrid
6. H_LHF : Low- then follow by high frequency Hybrid
7. LF : low frequency
8. LF_LP : LF- (Long period)
9. LF_T : LF- (Tornillo 0.7-8Hz 0.5-5min)
10. LF_ILF : LF- (Intermediate low frequency)
11. VLP : very-long period
12. E : eruption quake
13. V : generic volcanic quake without any further classification
14. R : regional tectonic earthquake
15. RF : Rockfall
16. PF : Pyroclastic Flow
17. G : Gas burst
18. Q : quarry blasts
19. U : unknown origin
20. O : Other, non-volcanic origin
21. X : Undefined

Description of the 8 types of earthquake classifications occurring in and at surrounding volcanoes:

1. **VT-type**
   VT-type is uses for volcanic earthquake that results from faulting failure mechanism. It is similar to regional seismic event except that it happens inside or underneath volcanic body. Many observatories might use different terminology, such as high-frequency event (HF). In the former time A-Type of Minakami's classification is more widely used. As this type of event is generated by faulting process, when the source-receiver distance is quite far (more than 2 km from Minakami's term), P and S phases could be clearly distinguished in seismogram. With a modern instrument, digital seismic record could identify VT-type that might be at a closer distance. Thus it is possible to identify VT-type of closer source. Faulting process generates a high frequency signal of more than 5 Hz. Thus, a term of "HF- event" is usually used in place of VT-type.
2. **H-type**
   H-type is used to name Hybrid seismic event. It is an events containing a combination of high and low frequency. B-Type from Minakami is based on that there is no clear S arrival, which could be similar to shallow VT (shallow VT). However it could be also related to a dome growth. Event-accompanying dome growth is in a form of Hybrid (St. Helens) (= or MP (Merapi)). Hybrid events usually consist of HF part (first onset) and LF part (coda) (Redoubt, Monserrat), whereas LHF is another hybrid with inverse order (LF first then HF).
3. **LF-type**
   Low frequency event is related to the volcanic process inside volcano. Fluid and gas play role in creating such an event. It frequency is about 0.5-5 Hz. There is no indication of P-S distinction because it is not from faulting mechanism.
4. **VLP**

Installation of broadband seismograph in many volcanoes could have revealed the presence of VLP events. Its signal period ranges from 2 to 30 second. (in Hachijo island T=20s; Erebus T=8-20s; Stromboli T=2-30s). Some recent studies conclude that VLP is related to a movement of a gas slug inside volcano conduit. (O'Brien and Bean, GRL 35, 2008)

5. **E (for Explosion)**
   Explosion event is seismic signal that accompany eruption process.
6. **T (for Tremor)**
   Tremor is a continuous seismic signal with a duration from several minutes to days. Many volcanoes produce tremor with only single dominant frequency (monochromatic tremor), or tremor with two or harmonic peaks (harmonic tremor). Some tremors, from record observation have wider frequency content (non-harmonic tremor). Earthquake swarm with dense event population, commonly happen prior to eruption, (=short interval between events) could produce non-harmonic tremor, or a "dense- events" tremor
7. **R**
   R-type, or regional type uses for tectonic earthquakes occurring close to the volcano. For individual volcanic cone, the term "close" refers to distance of less than 30 km (?) from the volcano edifice. For a volcanic zone, such as Campi Flegrei and Auckland volcanic zones, it refers to distance of 30 km (?) from the outer boundary of the zone. Storing data about tectonic earthquakes near volcano in the WOVOdat is important as in several cases that volcanic activity could be affected or re-awaked by tectonic earthquakes.

8. **Q-type**
   Quary blast occuring on volcanic region

R and Q is non-volcanic earthquake, however it may have a relation to volcanic activity or occured in volcanic area. V is used when the type is not specified.

To store more detail classification, earthquake subtypes are added.

Earthquake general classification	Type of earthquake	Subtype of earthquake
Regional Tectonic	Regional Tectonic (R)	
Quarry blast	Quarry blast (Q)	
Volcanic	General volcanic (V)	
	Volcano tectonic (VT)	General or non specified (VT)
		Deep (VT_D)
		Shallow (VT_S)
	Hybrid (H)	General or non specified (H)
		High- then follow by low frequency (H_HLF)
		Low- then follow by high frequency (H_LHF)
	Low frequency (LF)	Long period (LF_LP)
		Tornillo 0.7-8Hz 0.5-5min (LF_T)
		Intermediate low frequency (LF_ILF)
	Very long period (VLP)	
	Explosion (E)	
	Unknown origin (U)	
	Other, non volcanic origin (O)	
	Undefined (X)	

sd_evn_eqtype => 'R', 'Q', 'V', 'VT', 'VT_D', 'VT_S', 'H', 'H_HLF', 'H_LHF', 'LF', 'LF_LP', 'LF_T', 'LF_ILF', 'VLP', 'RF', 'E', 'U', 'O', 'X', 'G', 'PF'

Earthquake general classification	Type of tremor	Subtype of tremor
Volcanic	Tremor (T)	General or non specified (T)
		Harmonic (H)
		Monochromatic (M)
		Close-events tremor (C)

sd_trm_type => 'T','H','M','C'

Magnitude Types

The identifying factor for the magnitudes is the magnitude type, sd_evn_pmag_type and sd_evn_smag_type.
The magnitude types are limited to the following:

- **duration (Md)**
  The duration magnitude is based on the duration of shaking as measured by the time decay of the amplitude of the seismogram. This magnitude (also known as coda magnitude) is often used to compute magnitude from seismograms with "clipped" waveforms due to limited dynamic recording range of analog instrumentation.
- **local (ML)**
  The local magnitude (ML) is the original magnitude relationship defined by Richter and Gutenberg for local earthquakes and is based on the maximum amplitude of a seismogram recorded on a Wood-Anderson torsion seismograph (appropriate adjustments are made for modern instrumentation).
- **surface wave (Ms)**
  The surface wave magnitude (Ms) is used for distant earthquakes based on the amplitude of Rayleigh surface waves measured at a period near 20 sec.
- **moment (Mw)**
  The moment magnitude (Mw) is based on the moment of the earthquake, which is equal to the rigidity of the earth times the average amount of slip on the fault times the amount of fault area that slipped.
- **body (Mb)**
  The body magnitude (Mb) is based on the amplitude of P body- waves and is most appropriate for deep-focus earthquakes.

Appendix-5 Introduction to using WOVOdat (submit and visualize data)

Introduction to Using WOVOdat *(version September 2014)*

WOVOdat is a web-accessible database of worldwide historical volcanic unrest. Open user access which is launched during 2013 IAVCEI Kagoshima meeting allow the registered user to access the WOVOdat website (***www.wovodat.org***). Through this website, users will be able to obtain general information about WOVOdat and find 4 first-level menu selections:

- ***Documentation***: Users may consult and download documentations (user manual, SQL schema, XML format, table formats). A WOVOdat installable standalone package is available for observatories that want to adapt WOVOdat for their own data management.

- ***Submit Data***: Currently we offer 3 options for users to contribute data:
  (a) free format or original observatory format,
  (b) WOVOdat CSV standard format, and
  (c) Customary/known CSV format.
  Data can also be contributed using an online form and uploaded into SQL database following WOVOdat XML standard format.

- ***Volcano (data)***: Registered users will be able to query the database interactively and view volcano monitoring data set. Visualization tools in WOVOdat presently enable comparisons of processed monitoring data, e.g., earthquake hypocenters, displacements, and gas flux time series from different episodes of unrest from a single volcano, or from unrest of different but analogous volcanoes.
  A Boolean search tool, which is currently in development, allows the user to query specific volcano information and retrieve available monitoring data related to a specified eruption time. These search results can then also be displayed in an interactive time-series visualisation of eruption phases, alert level information, and monitoring data related to the eruption. The data set is still in an early stage of population, but contains enough data to show users its potential.

- ***Contact***: We invite scientists from volcano observatories, universities, and research institutions to participate in the growing of WOVOdat database by sharing their data and their expertise in developing visualization tools and other utilities (optimisazion of Boolean search, pattern recognition, data display, etc.). For further information, please contact WOVOdat developer team through *wovodat@-wovodat.org*.

1. Creating an account:

Fill in the registration form through http://www.wovodat.org/populate/regist_form.php

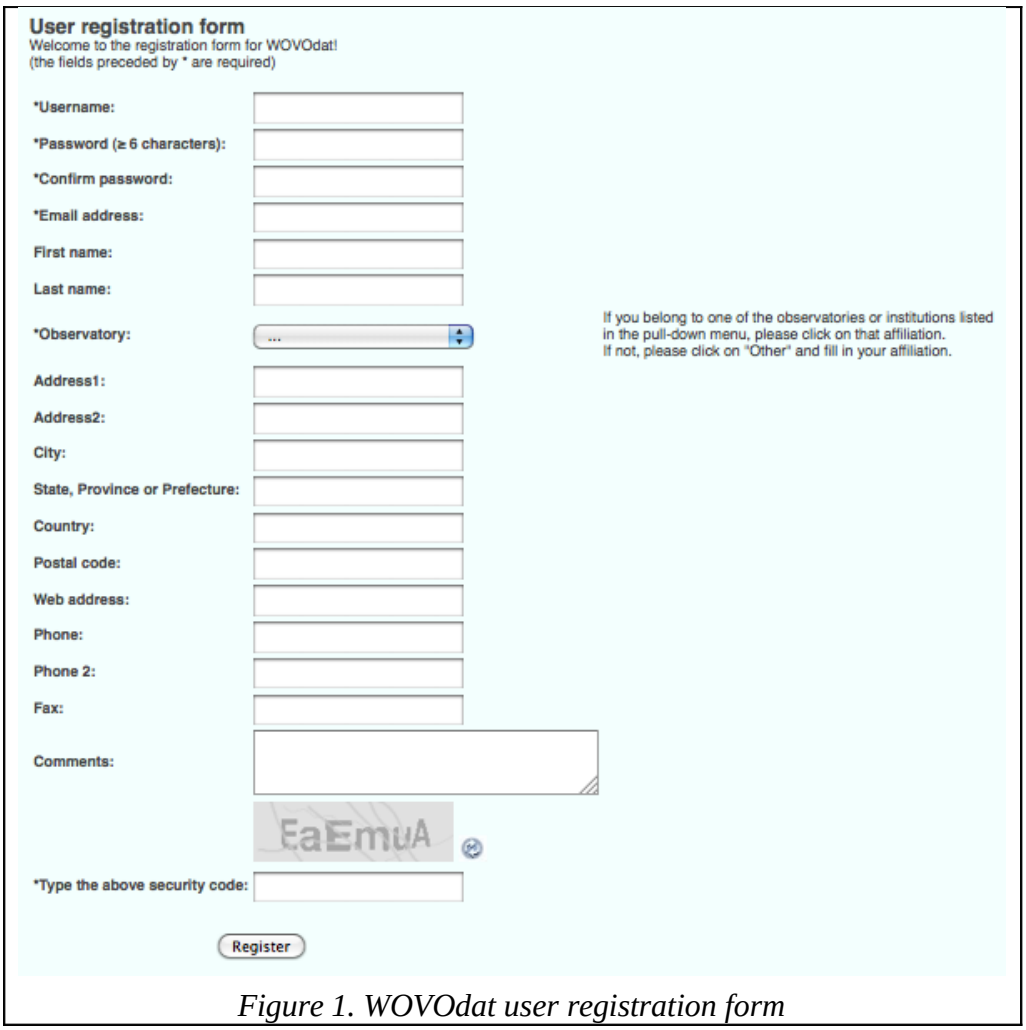


Figure 1. WOVOdat user registration form

QuickTime™ and a
decompressor
are needed to see this picture.

Figure 2. Registration process

When the filled form is successfully submitted into the system, an email will be sent to registered email address. To confirm the registration, the user will be required to click the link provided in the email.

QuickTime™ and a
decompressor
are needed to see this picture.

Figure 3. Registration confirmation

2. **Documents:** *http://www.wovodat.org/doc/*

Users may consult and download the WOVOdat documents (user manual, SQL schema, XML format, table formats, etc.).

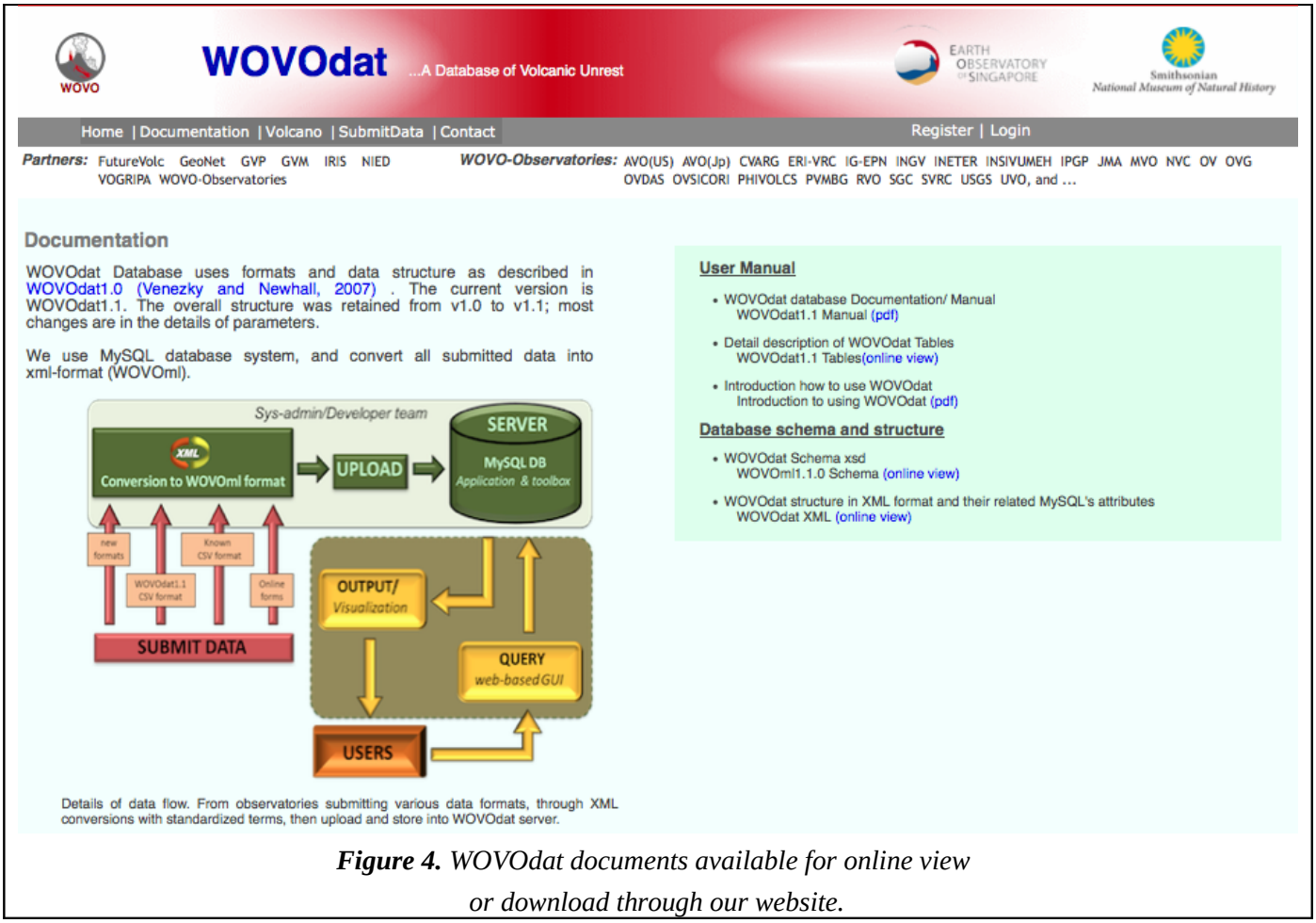


Figure 4. *WOVOdat documents available for online view or download through our website.*

A WOVOdat installable standalone package is available for observatories that want to adapt WOVOdat for their own data management (*http://www.wovodat.org/installing/download_installable.php*)

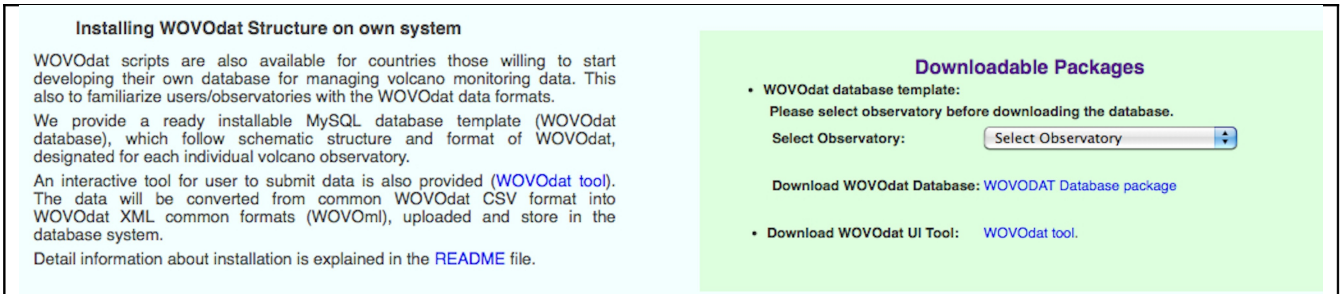


Figure 5. *WOVOdat package is downloadable, together with UI tools and installation README file.*

3. **SubmitData:** *http://www.wovodat.org/populate/home_populate.php*

For now, the database only accepts data in WOVOdat-XML (WOVOml) format. A short explanation on how to submit data into WOVOdat is available here (pdf).

We offer different options for contributors to submit data:

ONLINE DATA CONVERSION

Online data conversion allows the user to convert their observatory data from comma-separated values (CSV) into standardized WOVOdat-XML format (WOVOml).

1. Submission of original observatory data format.
   Send metadata/information and monitoring data file of any format to WOVOdat; and let the WOVOdat team convert and upload it to the database.

2. Submission of spreadsheet CSV file.(<2Mb):
   Send comma-separated values CSV file in WOVOdat1.1 standard/compliant format. CSV template for each table can be downloaded here (zip). Please refer to WOVOdat1.1 document for detailed information on data format.
   (a)CSV of monitoring system:
   Metadata/information concerning monitoring network, station, instrumentation, component, airplane/satellite

   (b)CSV of data:
   Monitoring data: Seismic, deformation, gas, hydrology, fields, thermal, and meteorology.

Customary online conversion

Send comma-separated values CSV file in standard observatory format (specifically for known/registered format by WOVOdat):

(c) CSV of customary format data

DATA UPLOAD

Option below only appears for the admin or developer team only:

3. Submission of small amount of data through online forms.
   Including bibliographic, inferred processes, volcano, observation about volcanic activity, observatory contact information.

Upload WOVOml file

After successfully converting their csv file to XML format, the user will be able to upload their WOVOml

format file to the MySQL database.

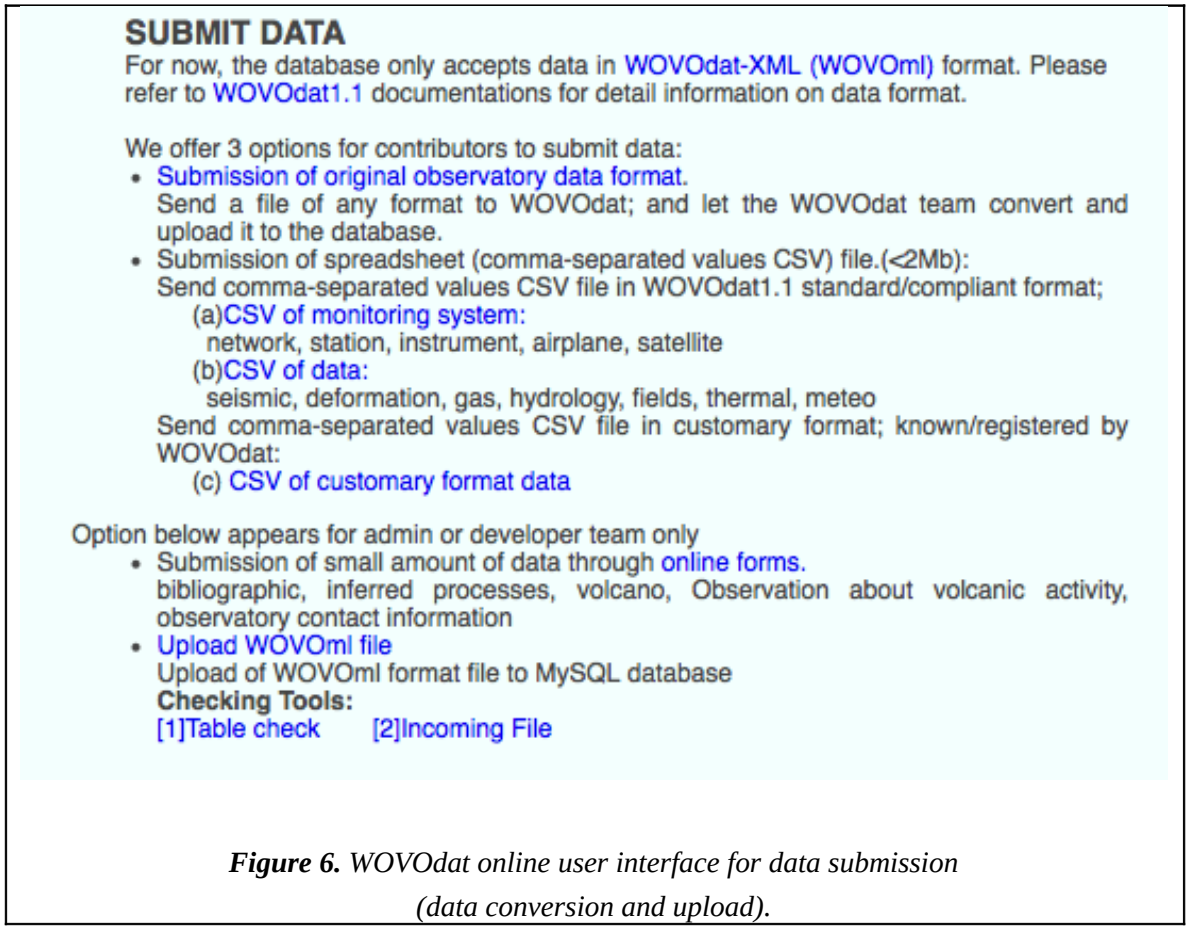


Figure 6. *WOVOdat online user interface for data submission (data conversion and upload).*

Submiting data through online conversion

(a) Monitoring system

User will be required to submit their volcano monitoring metadata/information prior submitting their monitoring data into WOVOdat database. WOVOdat divides volcano monitoring into 7 different groups: Seismic, deformation, gas, hydrology, fields, thermal, and meteorology.

Following hierarchical schema of WOVOdat, the user will first submit ***network*** => then follow by ***station*** => ***instrument*** => ***component*** (for seismic only).

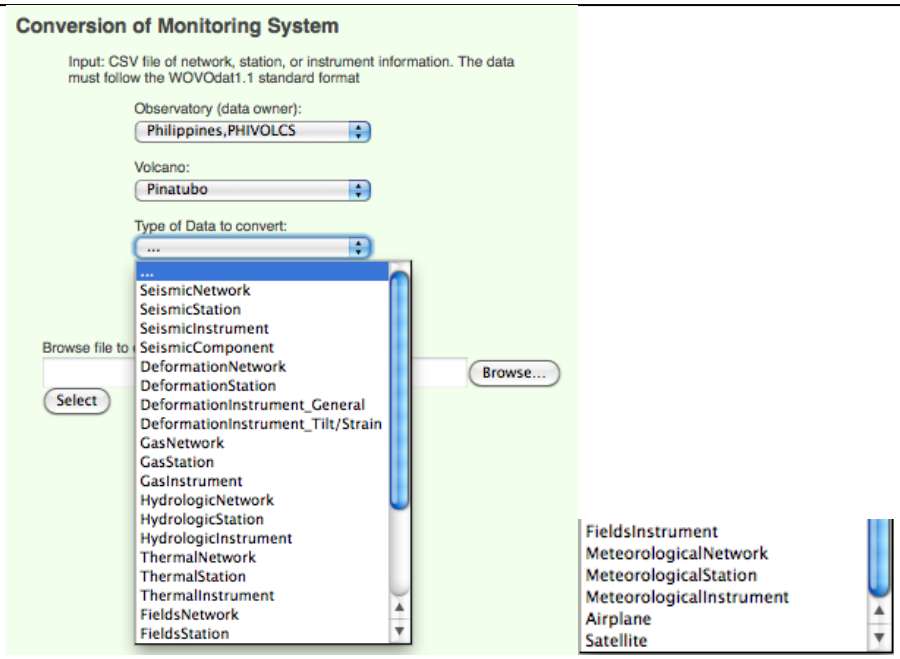


Figure 7. *WOVOdat online user interface to convert metadata/information about volcano monitoring system.*

(b) Monitoring data

Various types of monitoring data currently managed in the WOVOdat database are:

- Seismic: Event recorded by network, event recorded by single station, tremor, intensity, interval/swarm (earthquake count, seismic energy), waveform example, RSAM, and SSAM.
- Deformation: Tilt (radial-displacement and vector), strain, electronic distance measurement (EDM), angle, GPS (displacement and vector), leveling, and InSAR.
- Fields: Electric fields, gravity, magnetic (fields and vector)
- Gas: Directly sampled gas, plume, soil efflux.
- Hydrologic: Hydrologic measurement (physical and chemical component)
- Thermal: Ground based and remote thermal measurement
- Meteorological data

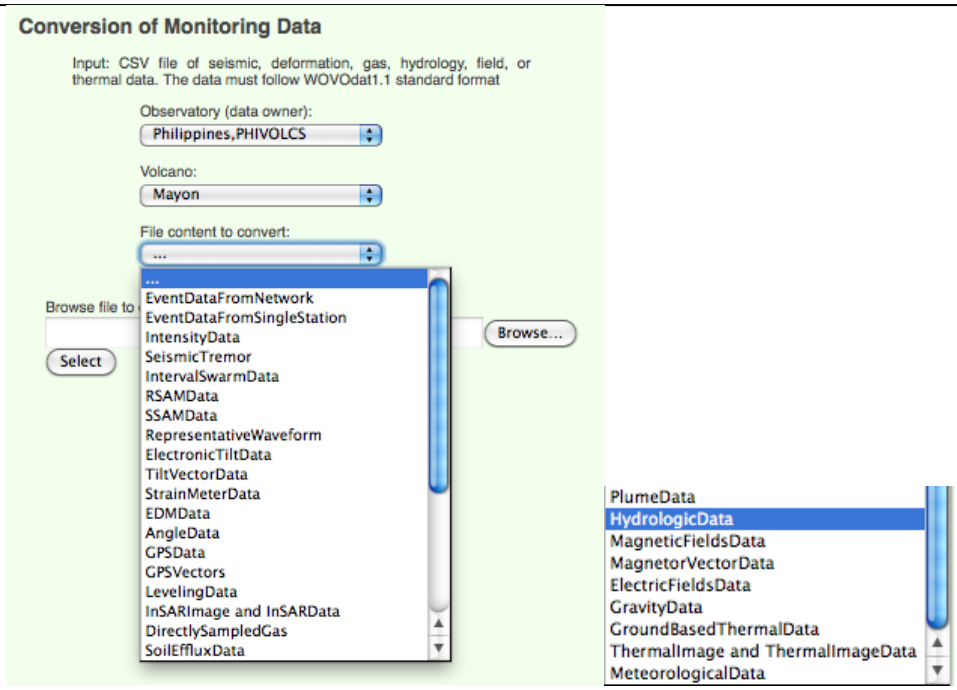


Figure 8. *WOVOdat online user interface to convert various type of volcano monitoring data.*

(c) Customary format data

This part is an automatic online conversion, intended for specific data format from observatory/partner, where the data format has already been mapped and known by WOVOdat system.

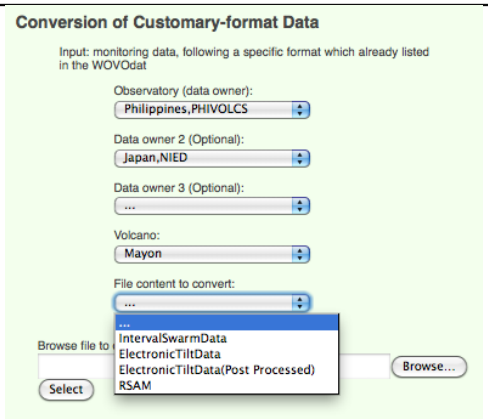


Figure 9. *Example of customary automatic conversion for PHIVOLCS data format.*

C-1. Interval Swarm Data	C-2. Electronic tilt data (post processed)

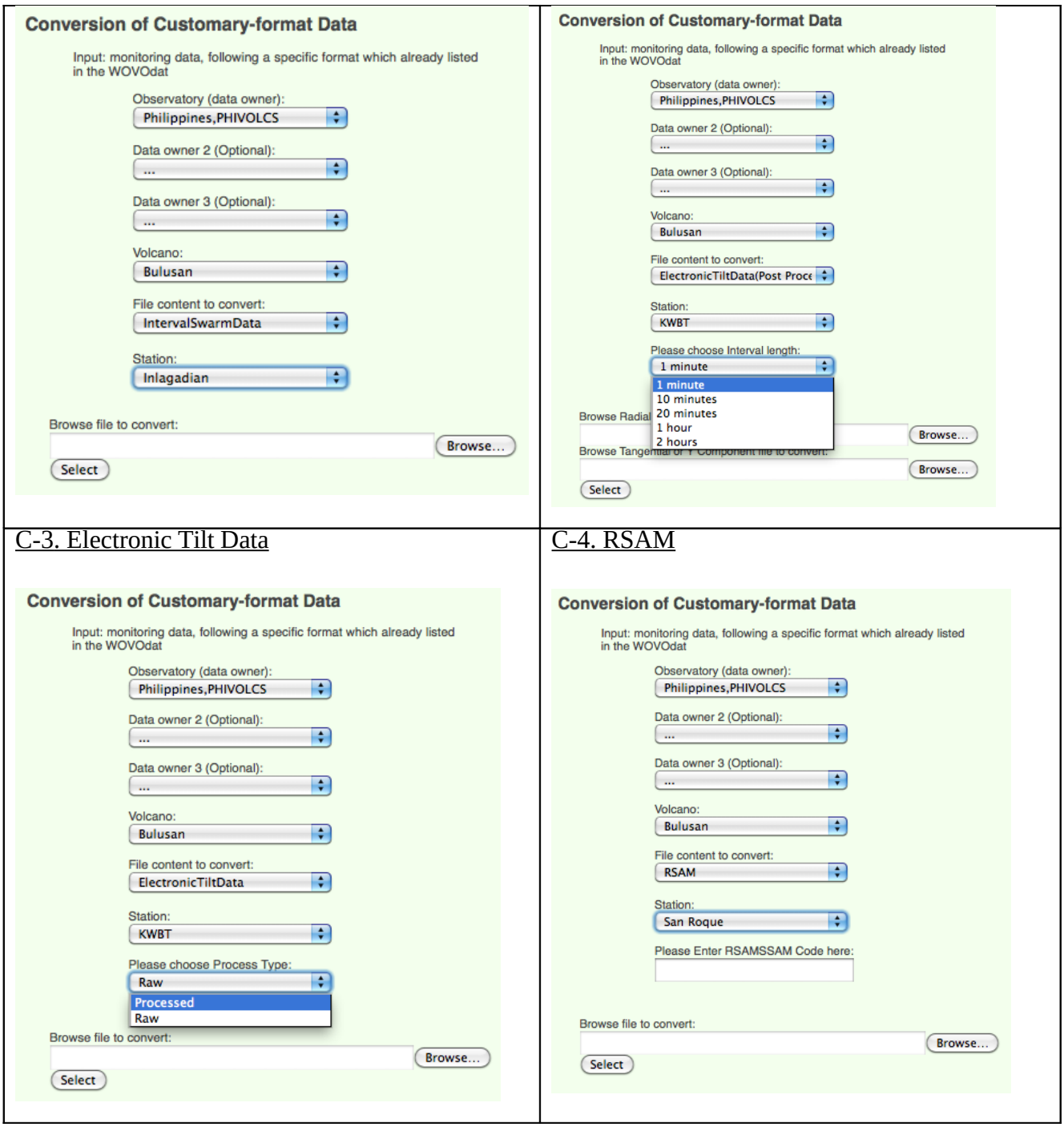


Figure 10. *Example of customary automatic conversion*

for PHIVOLCS data format (cont.).

Example of conversion processes: *Conversion of seismic-monitoring system*

A. Conversion of seismic network CSV to XML format.

Through online submission, the user inputs/uploads a CSV file *(following WOVOdat standard format).*

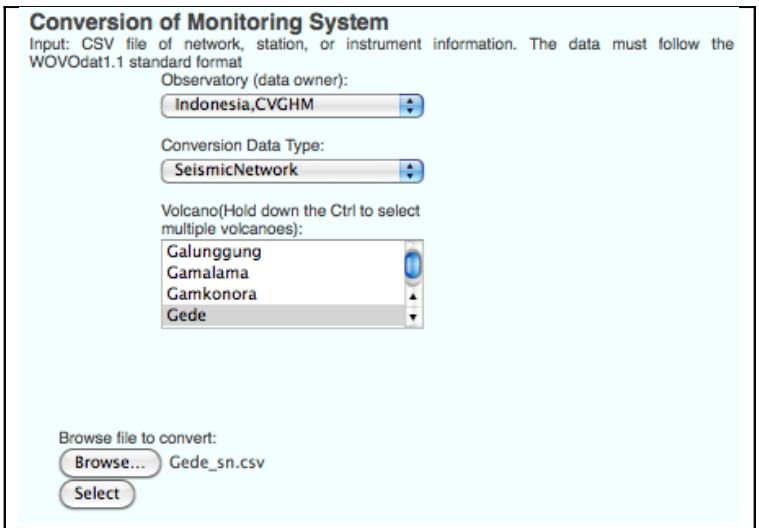


Figure 11. *Example of online conversion*

Below is an example of the seismic network (sn) table, following the WOVOdat CSV template.

sn_id	sn_code	vd_id	sn_name	sn_vmodel	sn_vmodel_detail
	Gede_Seismic_Net		Gede Seismic Network	Regional Velocity Model (... and others, 1993). Layer number Vp (km/sec) Top of layer (km) Vp/Vs 1 5.3 -3.0 1.78 2 5.6 4.0 1.78 3 6.2 10.0 1.78 4 6.9 15.0 1.78 5 7.4 20.0 1.78 6 7.7 35.0 1.78 7 7.9 33.0 1.78 8 8.1 47.0 1.78 9 8.3 65.0 1.78	/ home/wovodat/public_html/WOVOdat/region/06/03/wavefo rm/vmodel.txt

sn_zerokm	sn_fdepth_flag	sn_fdepth	sn_stime	sn_stime_unc	sn_etime	sn_etime_unc	sn_tot
0 elevation (sea level)	U	Unknown if depth is fixed	1980-08-01 06:00:00	NULL	NULL	NULL	10

sn_bb	sn_smp	sn_digital	sn_analog	sn_tcomp	sn_micro	sn_desc	sn_utc
5	5	10	0	7	0	Gede seismic monitoring system from CVGHM	7

sn_ori	sn_com	cc_id	cc_id2	cc_id3	sn_loaddate	sn_pubdate	cc_id_load	cb_ids
O	DUMMY DATA.	NULL	NULL	NULL	NULL	1992-08-17 06:00:00	NULL	NULL

Note:

- sn_id is primary key index for this table
- Red colored fields: vd_id, cc_id, and cb_ids are foreign key index, which link to another tables (in this case: vd, ss, and cb table).
- The fields highlighted in grey are left blank, since it will be assigned automatically by the system or filled by the web-form.
- Standard WOVOdat datetime is YYYY-MM-DD hh:mm:ss (preffered in UTC)
- Please see WOVOdat User manual (http://www.wovodat.org/doc/database/1.1/index.php) for more detailed information about the table format.

Converting CSV to WOVOml format:

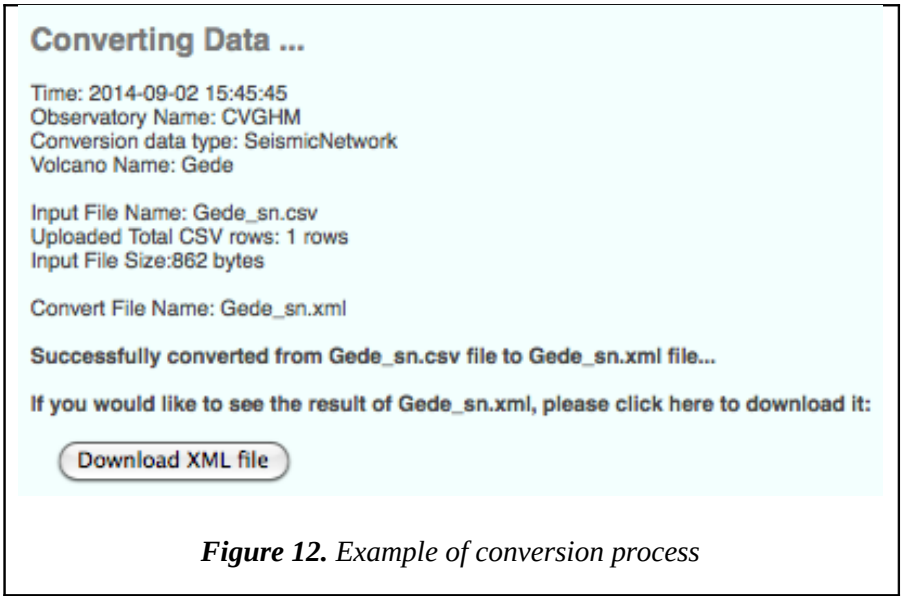


Figure 12. *Example of conversion process*

User will be able to retrieve the XML file, as conversion output. Below is an example of XML format for Gede seismic network (dummy data).

```
<?xml version="1.0" encoding="UTF-8" ?>
<wovoml xmlns="http://www.wovodat.org" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.1.0" xsi:schemaLocation="http://www.wovodat.org/WOVOdatV1.xsd">
<MonitoringSystems>
        <SeismicNetwork code="Gede_Seismic_Net" owner1="CVGHM" pubDate="1992-08-17 06:00:00">
                <Volcanoes>
                        <volcanoCode>0603-06=</volcanoCode>
                </Volcanoes>
                <name>Gede Seismic Network</name>
                <velocityModel>Regional Velocity Model (... and others, 1993).
                        Layer number Vp (km/sec) Top of layer (km) Vp/Vs
                        1 5.3 -3.0 1.78
                        2 5.6 4.0 1.78
                        3 6.2 10.0 1.78
                        4 6.9 15.0 1.78
                        5 7.4 20.0 1.78
                        6 7.7 35.0 1.78
                        7 7.9 33.0 1.78
                        8 8.1 47.0 1.78
                        9 8.3 65.0 1.78</velocityModel>
                <velocityModelDetail>/home/wovodat/public_html/WOVOdat/region/06/03/waveform/vmodel.txt</velocityModelDetail>
                <zeroDepth>0 elevation (sea level)</zeroDepth>
                <fixedDepth>U</fixedDepth>
                <fixedDepthDesc>Unknown if depth is fixed</fixedDepthDesc>
                <startTime>1980-01-17 06:00:00</startTime>
                <numberOfSeismo>10</numberOfSeismo>
                <numberOfBBSeismo>5</numberOfBBSeismo>
                <numberOfSMPSeismo>5</numberOfSMPSeismo>
                <numberOfDigiSeismo>10</numberOfDigiSeismo>
                <numberOfAnaSeismo>0</numberOfAnaSeismo>
```

```
            <numberOf3CompSeismo>7</numberOf3CompSeismo>
            <numberOfMicro>0</numberOfMicro>
            <description>Gede seismic monitoring system from CVGHM </description>
            <diffUTC>7</diffUTC>
            <orgDigitize>O</orgDigitize>
            <comments>DUMMY DATA.</comments>
        </SeismicNetwork>
</MonitoringSystems>
    </wovoml>
```

B. Upload XML file to the MySQL database.

Figure 13. *Example of data uploading process*

Data is stored in the database.

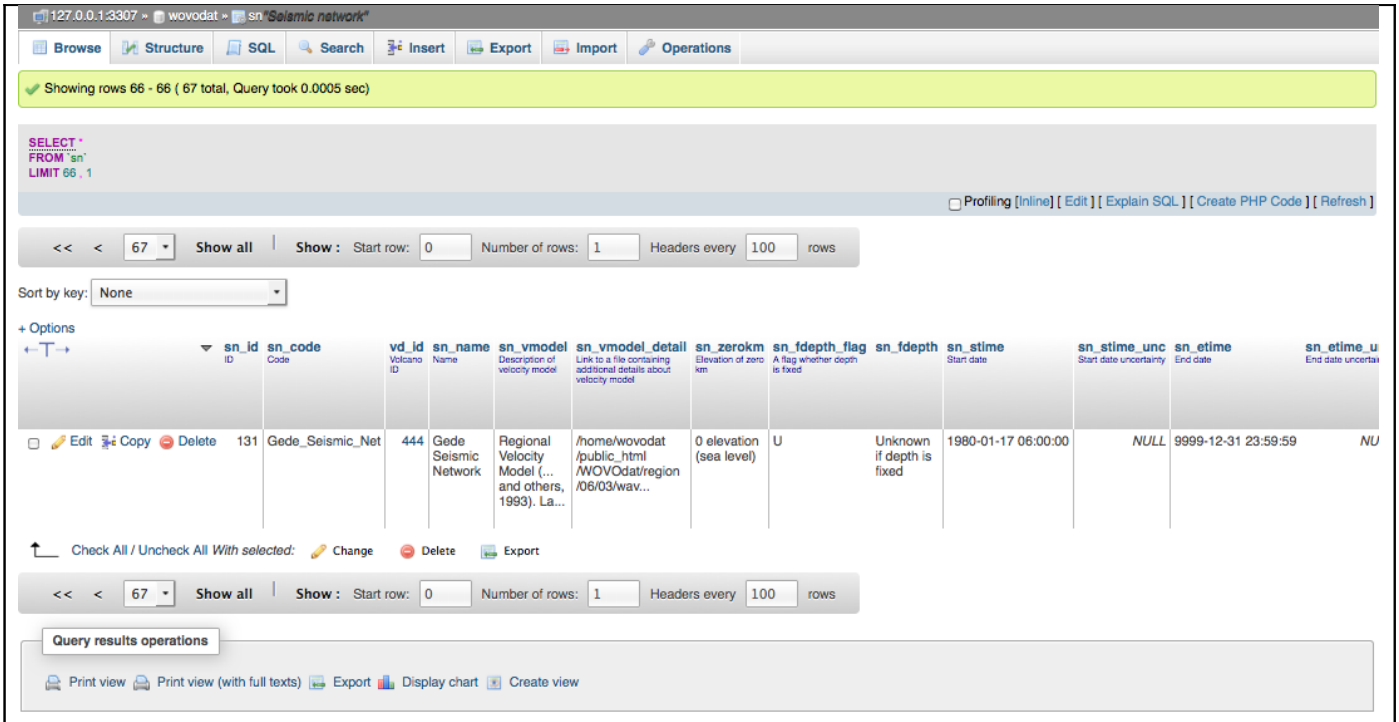


Figure 14. *Data successfully input into MySQL database*

Submiting data through online form:

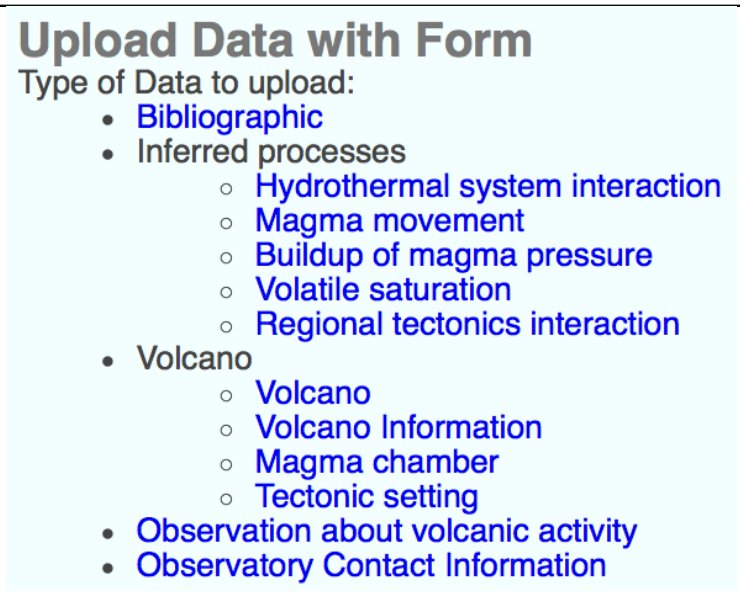


Figure 15. *List of various type of WOVOdat online form*

⇨ Bibliography table

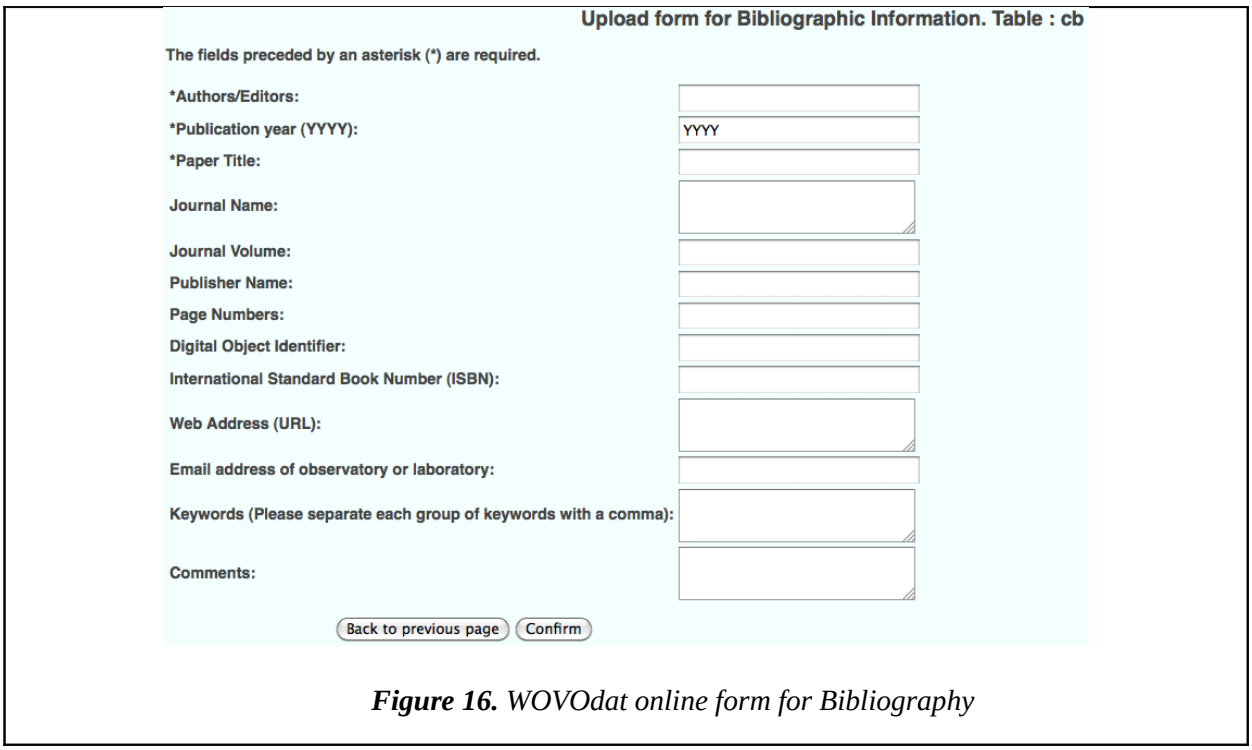


Figure 16. *WOVOdat online form for Bibliography*

⇨ Hydrothermal system interaction

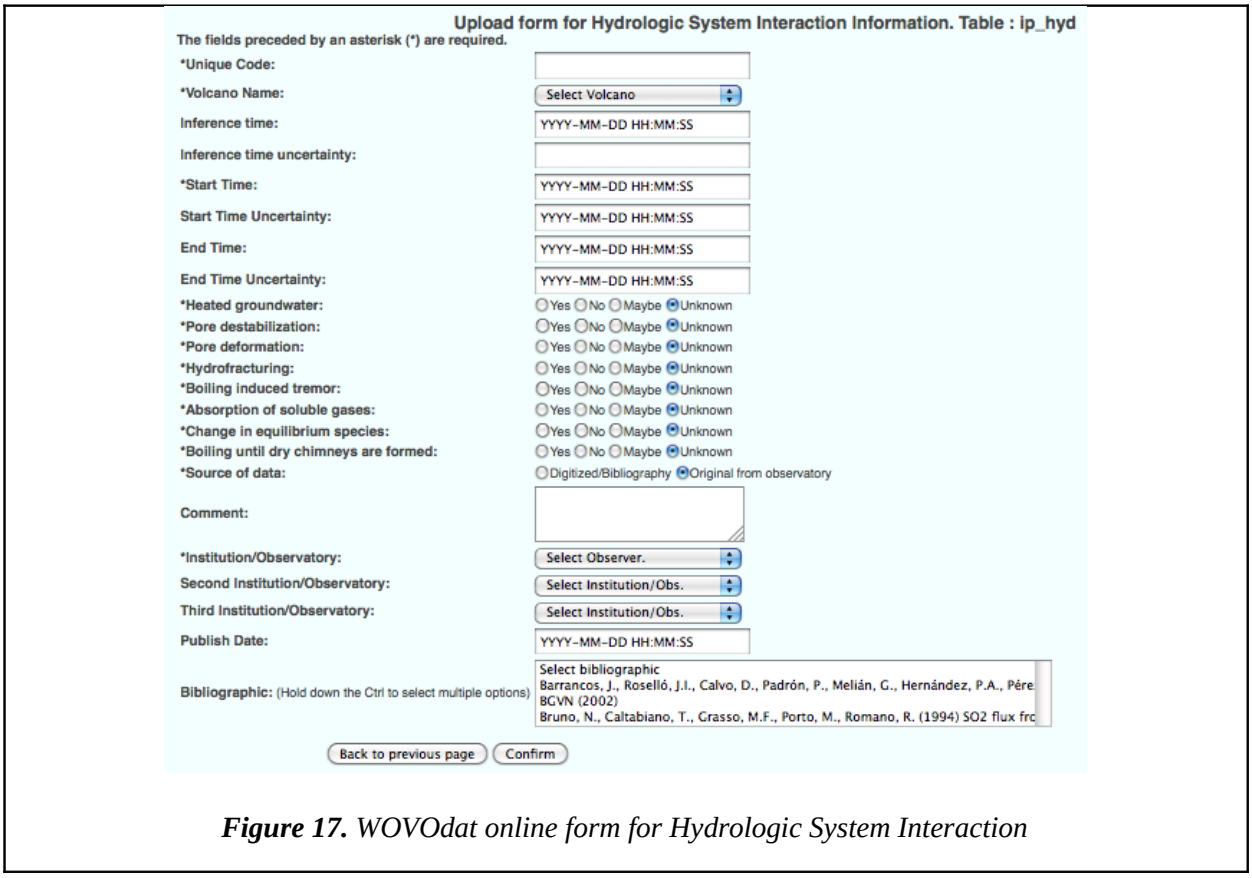


Figure 17. *WOVOdat online form for Hydrologic System Interaction*

4. **Volcano(data):** *http://www.wovodat.org/precursor/index_unrest_devel_v5.php*

Registered users will be able to interactively query the database and view volcano monitoring dataset.

A Boolean search tool, which is currently in development, allows the user to query specific volcano information and retrieve available monitoring data related to a specified eruption time.
Currently we are able to apply 6 different filters simultaneously, where time frame (start-time and end-time) is required. The filters are:

Volcano criteria:

- Volcano morphological type
- Dominant rock type

Eruption criteria:

- Eruption phase type
- Eruption VEI

Monitoring data criteria:

- Multiple selection on data-type availability

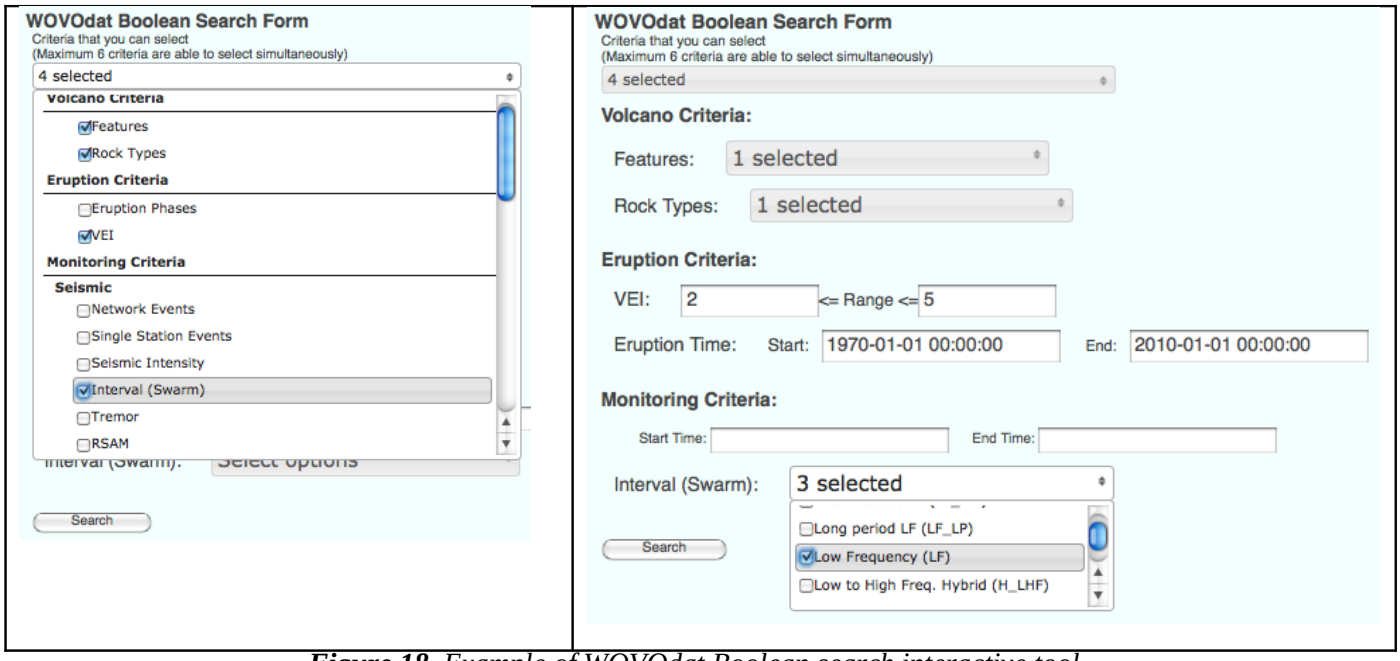


Figure 18. *Example of WOVOdat Boolean search interactive tool*

Data Search Results: 30

Volcano Name	Vol Feature	Vol Rock Types	Eruption Start time	Eruption End time	VEI	Monitoring Data Type	Monitoring Start Time	Monitoring End Time	Visualization
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1978-03-07 00:00:00	1978-09-00 00:00:00	2	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1984-09-09 11:00:00	1984-10-06 00:00:00	3	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1993-02-02 12:11:00	1993-04-04 00:00:00	2	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1999-06-22 12:58:00	2000-03-19 00:00:00	3	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2000-07-16 00:29:00	2000-08-31 12:32:00	2	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2001-01-08 00:00:00	2001-08-08 00:00:00	3	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2003-03-17 12:19:00	2003-05-14 12:13:00	2	sd_lvl(VT_D)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1972-10-06 00:20:00	1985-03-00 00:00:00	2	sd_lvl(VT_D)	1990-01-01 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1986-10-10 00:00:00	1990-08-00 00:00:00	2	sd_lvl(VT_D)	1990-01-01 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1992-01-20 12:00:00	2002-10-19 00:00:00	2	sd_lvl(VT_D)	1990-01-01 00:00:00	2010-01-01 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1978-03-07 00:00:00	1978-09-00 00:00:00	2	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1984-09-09 11:00:00	1984-10-06 00:00:00	3	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1993-02-02 12:11:00	1993-04-04 00:00:00	2	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1999-06-22 12:58:00	2000-03-19 00:00:00	3	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2000-07-16 00:29:00	2000-08-31 12:32:00	2	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2001-01-08 00:00:00	2001-08-08 00:00:00	3	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2003-03-17 12:19:00	2003-05-14 12:13:00	2	sd_lvl(LF)	2003-01-01 00:00:00	2006-11-30 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1972-10-06 00:20:00	1985-03-00 00:00:00	2	sd_lvl(LF)	1990-04-04 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1986-10-10 00:00:00	1990-08-00 00:00:00	2	sd_lvl(LF)	1990-04-04 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1992-01-20 12:00:00	2002-10-19 00:00:00	2	sd_lvl(LF)	1990-04-04 00:00:00	2010-01-01 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1978-03-07 00:00:00	1978-09-00 00:00:00	2	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1984-09-09 11:00:00	1984-10-06 00:00:00	3	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1993-02-02 12:11:00	1993-04-04 00:00:00	2	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	1999-06-22 12:58:00	2000-03-19 00:00:00	3	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2000-07-16 00:29:00	2000-08-31 12:32:00	2	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2001-01-08 00:00:00	2001-08-08 00:00:00	3	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Mayon	Stratovolcano	Andesite/Basaltic Andesite	2003-03-17 12:19:00	2003-05-14 12:13:00	2	sd_lvl(VT_S)	2003-01-01 00:00:00	2006-12-30 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1972-10-06 00:20:00	1985-03-00 00:00:00	2	sd_lvl(VT_S)	1984-06-01 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1986-10-10 00:00:00	1990-08-00 00:00:00	2	sd_lvl(VT_S)	1984-06-01 00:00:00	2010-01-01 00:00:00	Link
Merapi	Stratovolcano	Andesite/Basaltic Andesite	1992-01-20 12:00:00	2002-10-19 00:00:00	2	sd_lvl(VT_S)	1984-06-01 00:00:00	2010-01-01 00:00:00	Link

Figure 19. *Example of Boolean search result*
Searching for volcano, with criteria as follow:
Morphology type: stratovolcano
Dominant rock type: Andesite/Basaltic Andesite
Eruption: 1 VEI 5
Monitoring data: seismic interval (earthquake type: VT_S, VT_D, and LF)

Visualization tools in WOVOdat presently enable comparisons of processed monitoring data, e.g., earthquake hypocenters, displacements, and gas flux time series from different episodes of unrest from a single volcano, or from unrest of 2 different but analogous volcanoes. Nearly all data in WOVOdat are time-stamped and georeferenced, so that they can be studied in both space and time.

The data set is still in an early stage of population, but contains enough data to show users its potential.

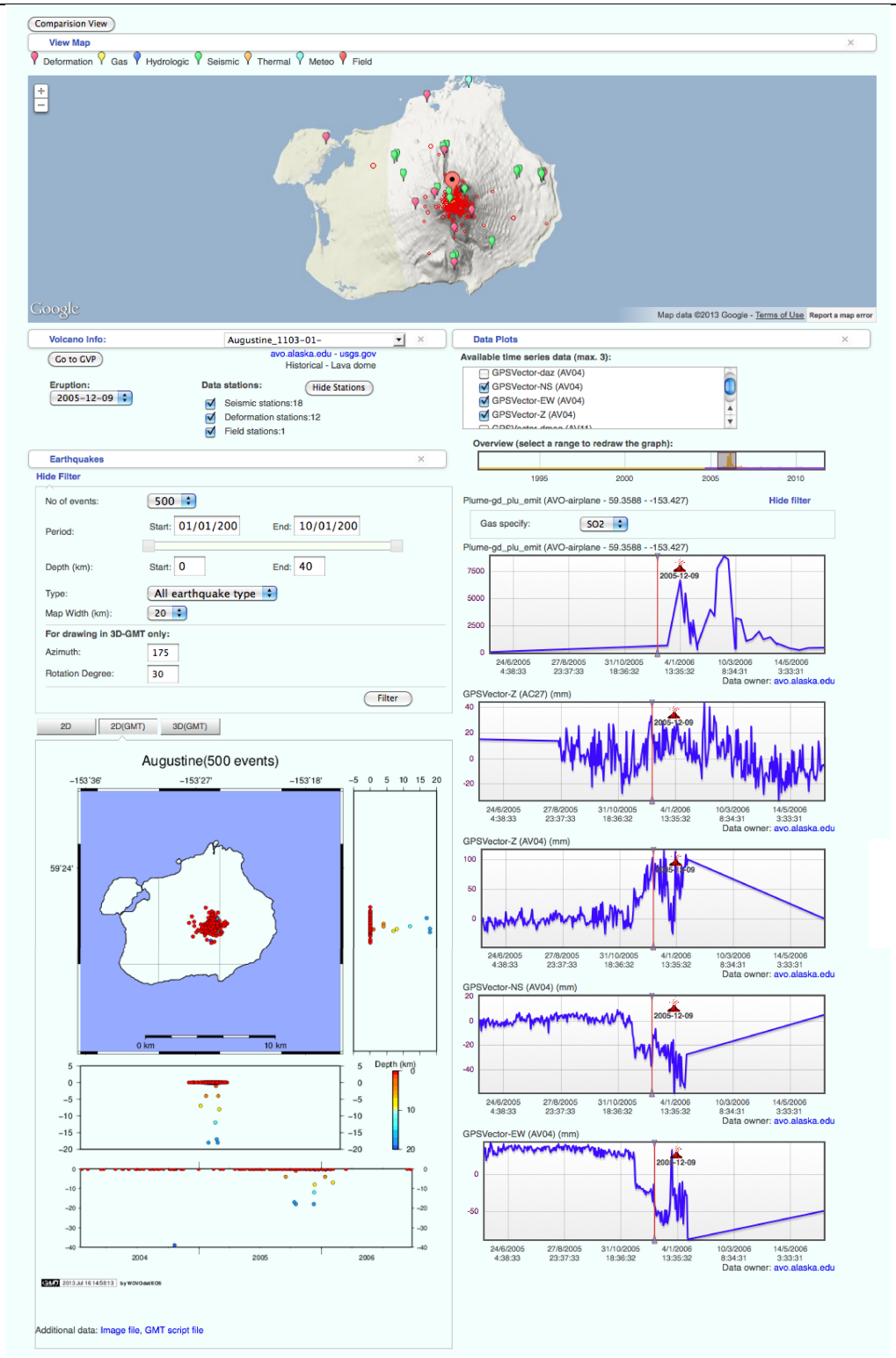


Figure 20. *Example of visualization: precursory data of Augustine eruption 5 Dec 2005.*

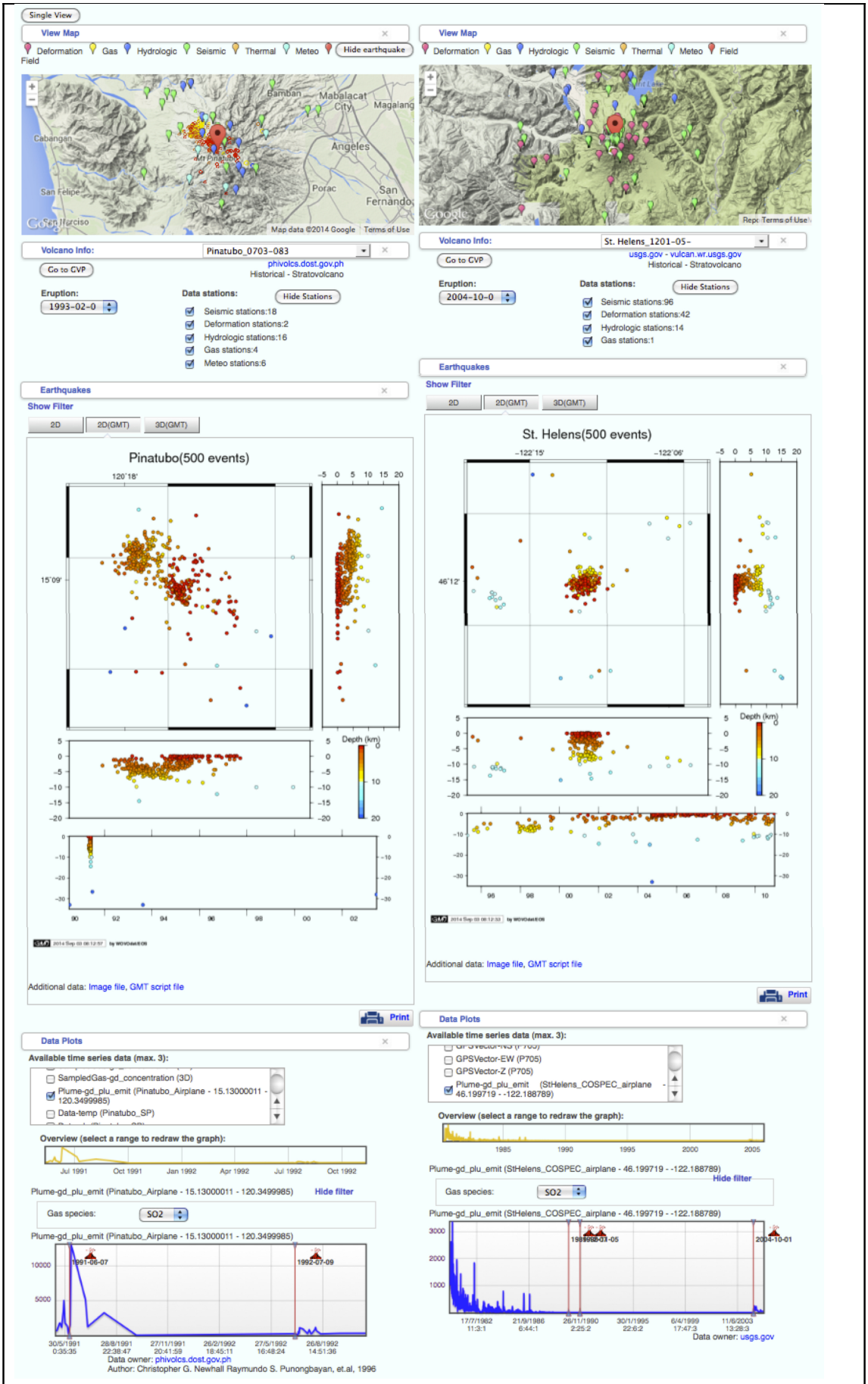


Figure 21. *Data comparison between Pinatubo and St. Helens eruptions.*

The Boolean search results can then also be displayed in an interactive time-series visualization of eruption phases, alert level information, and monitoring data related to the eruption.

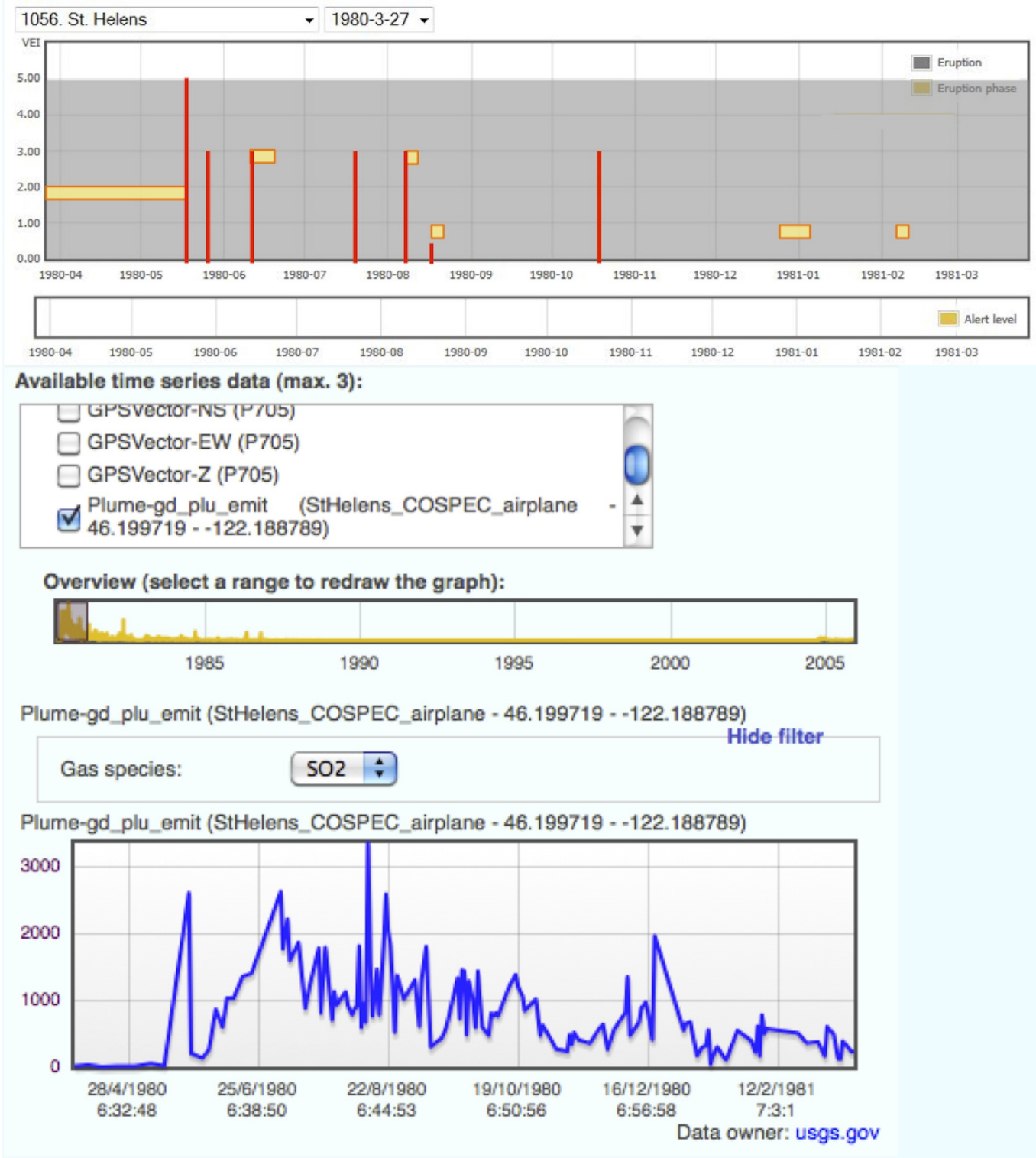


Figure 22. *Eruption interactive visualization tool for St. Helens 1980 eruption,*

This visualization tool is currently in development.

5. **Contact:** *http://www.wovodat.org/populate/contact_us_form.php*

The more data in WOVOdat, the more useful it will be. We invite scientists from volcano observatories, universities, and research institutions to participate in the growing of WOVOdat database by sharing their data and their expertise in developing visualization and other utilities.

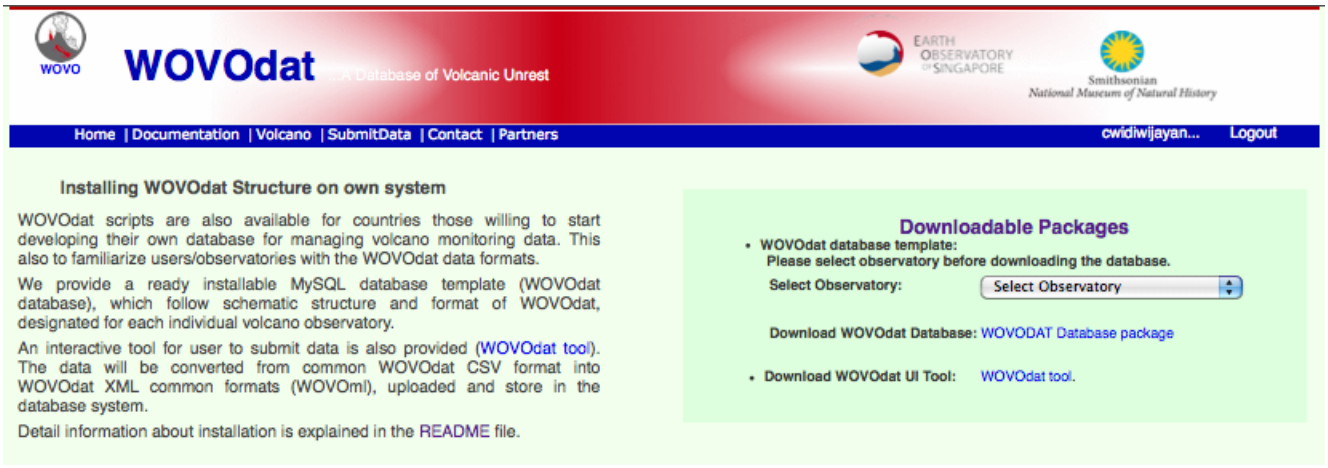
Contact us via email:
WOVOdat developer team (*wovodat@wovodat.org*)

Appendix-6 WOVOdat standalone package

Installing WOVOdat Structure on own system (version: September 2014)

WOVOdat scripts are also available for countries those willing to start developing their own database for managing volcano monitoring data. This also to familiarize users/observatories with the WOVOdat data formats.
We provide a ready installable MySQL database template (WOVOdat database), which follow schematic structure and format of WOVOdat, designated for each individual volcano observatory.
An interactive tool for user to submit data is also provided (WOVOdat tool). The data will be converted from common WOVOdat CSV format into WOVOdat XML common formats (WOVOml), uploaded and store in the database system.
Detail information about installation is explained in the README file.

Package downloadable through: http://www.wovodat.org/installing/download_installable.php



Setting Up The Computer for WOVOdat
And Installing WOVOdat database
(last updated: Sep 2014)

This documentation is for Ubuntu 12.04 LTS.

Getting Started

The WOVOdat is a Linux base SQL of volcanic unrest database. In this tutorial we will describe an example on how to install WOVOdat database into a localhost on an Ubuntu base system.

Note: To be able to install WOVOdat packages, the user should be sys-admin or have sys-admin privileges.

Prerequisite:
Computer running Ubuntu operating system. The latest Ubuntu can be obtained from http://www.ubuntu.com.

The following packages are required:

- Apache2
- Mysql
- Php5 (Note: Please install Php version 5.4 or earlier)
- Php-pear
- Php-db
- Phpmyadmin – The GUI tool to handle the administration of mysql
- GMT

The following packages are optional:

- Openssh-server
- Filezilla --GUI tool to transfer file(s) between computers
- Image Magick

  %apt-get install imagemagick

The above packages can be downloaded and installed from the Ubuntu online repository using the Ubuntu apt-get tool or Synaptic Package Manager.

Installation

- **Install Apache2**

```
% sudo apt-get install apache2

% echo "ServerName  localhost" | sudo tee
/etc/apache2/conf.d/fqdn
```

Check the Apache2 installation

- Using web browser go to the URL http://localhost, if you see "It works!", this proves that the Apache works.

- **Install php5**

```
% sudo apt-get install php5

% echo "<?php phpinfo(); ?>" | sudo tee
/var/www/test.php
```

Check the PHP 5 installation

- Restart apache2:

```
% sudo /etc/init.d/apache2 restart
```

- Go to the URL http://localhost/test.php, if you can see the description of PHP5 configuration, it proves that PHP5 installation is successful.

- **Install mysql**

```
% sudo apt-get install mysql-server mysql-client mysql-
common
```

Check the mysql installation

- From the terminal:

```
% mysql –u root –p
```

If it prompts you for the password to login, it means that MySQL is successfully installed.

- **Install phpmyadmin**

```
% sudo apt-get install phpmyadmin
% sudo /etc/init.d/apache2 restart
```

Check the phpmyadmin installation

- Go to the URL http://localhost/phpmyadmin, if you can see the phpmyadmin login page, it proves that the phpmyadmin works fine. The user will need to provide the root login of mysql to log into phpmyadmin. Once logged in, the user can create the phpmyadmin user account(s).
(Note: path will be different if you are installing on virtual machine)

If you do not see the phpmyadmin login page, do the following steps and go to the URL http://localhost/phpmyadmin again.

```
%sudo ln -s /etc/phpmyadmin/apache.conf
/etc/apache2/conf.d/phpmyadmin.conf

% sudo /etc/init.d/apache2 restart
```

- **Install php-pear**

```
% sudo apt-get install php-pear
```

- **Install php-db**

```
% sudo apt-get install php-db
```

- **Install openssh-server**

```
% sudo apt-get install openssh-server
```

- **Install filezilla**

```
% sudo apt-get install filezilla
```

- **Install Image Magick (Ubuntu 12.04 LTS needs it)**

```
% apt-get install imagemagick
```

- **Install netCDF**

  - Download netCDF from http://www.unidata.ucar.edu/downloads/netcdf/netcdf-4_1_3/index.jsp

  - Uncompress the downloaded file at /home/usrName directory. The **/home/usrName/netcdf-4.1.3** will be created after uncompressing the netcdf-4.1.3.tar.gz.

```
% tar -zxvf netcdf-4.1.3.tar.gz
```

  - Compile and install netCDF. By default, netCDF is installed in /usr/local and it is recommended.

```
% cd /home/username/netcdf-4.1.3

% sudo apt-get install make

% sudo ./configure –disable-netcdf-4

% sudo make check install
```

- **Install GMT**

  - Go to the link http://gmt.soest.hawaii.edu/ and click on the "Download" link that is on left side menu. After that, click on "INSTALL_FORM" is in the middle of the page. Find the "install_gmt.sh" file and download it to your favor directory.

  - Go into that the directory where GMT is downloaded. Execute the following command and accept the given default option.

```
% chmod 755 ./install_gmt.sh
% sudo  ./install_gmt.sh
```

Note:

- **DO NOT** install netCDF through install_gmt.sh because the netCDF installed by install_gmt.sh is pretty old version and we have already installed the netCDF-4.1.3 which is the newer version.
- The **install_gmt.sh** must be executed as super user. In order for the GMT works with WOVOdat, the GMT tool should be installed in **/usr/lib/gmt/bin**

- **Refer to the sample installation below**

```
% sudo ./install_gmt.sh

====>>>> Interactive installation of GMT <<<<====

We first need a questions and answer session to determine how
and where GMT is to be installed.   Then, when all parameters
have been assembled, we will run the installation (unless you
chose -n when starting this script).

This script will install the latest version of GMT 4.5.8.

==> Enter make utility to use [make]: make

If you are behind a firewall you will need to use a passive ftp session.
Only if you have some very old ftp client, you may have to resort to active ftp
(which involves the server connecting back to the client).

==> Do you want passive ftp transmission (y/n) [y]: y
==> Have you installed netcdf (version 3.6 or later)? (y/n) [y]: y
==> Enter directory with netcdf lib and include [/usr/local]: /usr/local

GMT4 offers experimental and optional support for other grid formats
and plotting of geotiffs via GDAL.  To use this option you must already
have the GDAL library and include files installed.

==> Use experimental GDAL grid input in GMT4 (y/n) [y]: n
==> Install GMT version 4.5.8? (y/n) [y]: y
==> Install GSHHS version 2.2.0? (y/n) [y]: y
==> Get the GMT version 4.5.8 archive (38 Mb) via ftp? (y/n) [y]: y
==> Get the GSHHS version 2.2.0 archive (45 Mb) via ftp? (y/n) [y]: y
```

We offer 9 different ftp sites. Choose the one nearest you in order to minimize net traffic and transmission times. The sites are:

1. SOEST, U of Hawaii [GMT Home], Honolulu, Hawaii, USA
2. NOAA, Lab for Satellite Altimetry, Silver Spring, Maryland, USA
3. IRIS, Incorporated Research Institutions for Seismology, Seattle, Washington, USA
4. IAG-USP, Dept of Geophysics, U. of Sao Paulo, BRAZIL
5. Dept of Geosciences, U of Oslo, NORWAY
6. Goodie Domain Service, Vienna U of Techology, AUSTRIA
7. Tokai U, Shimizu, JAPAN
8. School of Geosciences, U of Sydney, AUSTRALIA
9. TENET, Tertiary Education & Research Networks of South Africa, SOUTH AFRICA

==> Enter your choice [1]: 7
You selected site number 7:
7. Tokai U, Shimizu, JAPAN

This anonymous ftp server ftp.scc.u-tokai.ac.jp only accepts connections from computers on the Internet that are registered in the Domain Name System (DNS). If you encounter a problem connecting because your computer is not registered, please either use a different computer that is registered or see your computer systems administrator (or your site DNS coordinator) to register your computer.

GMT can use two different algorithms for Delauney triangulation.

Shewchuk [1996]: Modern and very fast, copyrighted.
Watson [1982] : Older and slower, public domain.

Because of the copyright, GMT uses Watson's routine by default.
However, most will want to use the optional Shewchuk routine.
==> Use optional Shewchuk's triangulation routine (y/n)? [y]: y

The installation will install all GMT components in several subdirectories under one root directory. On most Unix systems this root directory will be something like /usr/local or /sw, under which the installation will add bin, lib, share, etc. Below you are asked to select to location of each of the subdirectories.

==> Directory for GMT4 executables? [/home/wovodat/GMT4.5.8/bin]: **/usr/lib/gmt/bin**
==> Directory for GMT4 linkable libraries? [/usr/lib/gmt/lib]: **/usr/lib/gmt/lib**
==> Directory for GMT4 include files? [/usr/lib/gmt/include]: **/usr/lib/gmt/include**
==> Directory for GMT4 data resources? [/usr/lib/gmt/share]: **/usr/lib/gmt/share**

Unix man pages are usually stored in /usr/man/manX, where X is the relevant man section. Below, you will be asked for the /usr/man part;
the /manX will be appended automatically, so do not answer /usr/man/man1.

==> Directory for GMT4 man pages? [/usr/lib/gmt/man]: **/usr/lib/gmt/man**
==> Directory for GMT4 doc pages? [/usr/lib/gmt/share/doc/gmt]: **/usr/lib/gmt/share/doc/gmt**

At run-time GMT4 will look in the directory /usr/lib/gmt/share to find configuration and data files. That directory may appear with a different name to remote users if a different mount point or a symbolic link is set. GMT4 can use the environment variable $GMT_SHAREDIR to point to the right place. If users see a different location for the shared data files, specify it here. (It will be used only to remind you at the end of the installation to set the enronment variable $GMT_SHAREDIR).

==> Enter value of GMT_SHAREDIR selection [/usr/lib/gmt/share]:
/usr/lib/gmt/share

The answer to the following question will modify the GMT4 defaults. (You can always change your mind by editing share/gmt.conf)

==> Do you prefer SI or US default values for GMT4 (s/u) [s]: s

The answer to the following question will modify the GMT4 defaults.
(You can always change your mind later by using gmtset)

PostScript (PS) files may contain commands to set paper size, pick a specific paper tray, or ask for manual feed. Encapsulated PS files (EPS) are not intended for printers (but will print ok) and can be included in other documents. Both formats will preview on most previwers (out-of-date Sun pageview is an exception).

==> Do you prefer PS or EPS as default PostScript output (p/e) [p]: p

Building the GMT4 libraries as shared instead of static will reduce executable sizes considerably. GMT supports shared libraries under Linux, Mac OS X, SunOS, Solaris, IRIX, HPUX, and FreeBSD. Under other systems you may have to manually configure macros and determine what specific options to use with ld.

==> Try to make and use shared libraries? (y/n) [n]: n

If you have more than one C compiler you need to specify which, otherwise just hit return to use the default compiler.

==> Enter name of C compiler (include path if not in search path):

GMT4 can be built as 32-bit or 64-bit. We do not recommend to explicitly choose 32-bit or 64-bit, as the netCDF install is not set up to honor either of these settings. The default is to compile without sending any 32-bit or 64-bit options to the compiler, which generally create 32-bit versions on older systems, and 64-bit versions on newer systems, like OS X Snow Leopard.

==> Explicitly select 32- or 64-bit executables? (y/n) [n]: n
==> Produce universal executables (OS X)? (y/n) [n]: n

GMT4 passes information about previous GMT commands onto later GMT4 commands via a hidden file (.gmtcommands). To avoid that this file is updated by more than one program at the same time (e.g., when connecting two or more GMT4 programs with pipes) we

```
use POSIX advisory file locking on the file.  Apparently, some
versions of the Network File System (NFS) have not implemented
file locking properly.  We know this is the case with Linux
pre-2.4 kernels when mounting NFS disks from a Unix server.
If this is your case you should turn file locking OFF.

==> Use POSIX Advisory File Locking in GMT4 (y/n) [n]: n
==> Want to test GMT4 by running the 30 examples? (y/n) [y]: y
==> Delete all tar files after install? (y/n) [n]: n
==> Enter name of the parameter file that will now be created
[GMT4param.txt]: GMT4param.txt
Session parameters written to file GMT4param.txt
==> Hit return to start the install:
```

- After GMT installation, add the following entries into **/root/.bashrc and /home/wovodat/.bashrc** if the entries have not been set.

```
export
PATH=/usr/lib/gmt/bin:/usr/lib/gmt/lib:/usr/lib/gmt/include:/usr/lib:$PATH
export GMTHOME=/usr/lib/gmt
export GMTPATH=/usr/lib/gmt/bin
export MANPATH=/usr/lib/gmt/man:/usr/share/man:$MANPATH
```

Check GMT installation

- **From the terminal:**

```
% source .bashrc

%man psxy  (OR)  %  psxy
```

If GMT is successfully installed , it shows a manual page.

Install WOVOdat Tool

- Download WOVODAT User Interface Tool (wovodat_Tool.tar) from http://wovodat.org/installing/download_installable.php and save it under the directory: /home. This tar file includes:

    - Subdirectory-paths to organize and store script and data files.

    - PHP and HTML scripts for web-based user interface; include WOVOdat ***Documentation, Visualization*** and ***Submit Data*** with all scripts to convert WOVOdat CSV format into WOVOdat XML format, and upload WOVOdat XML to store the data into the database.

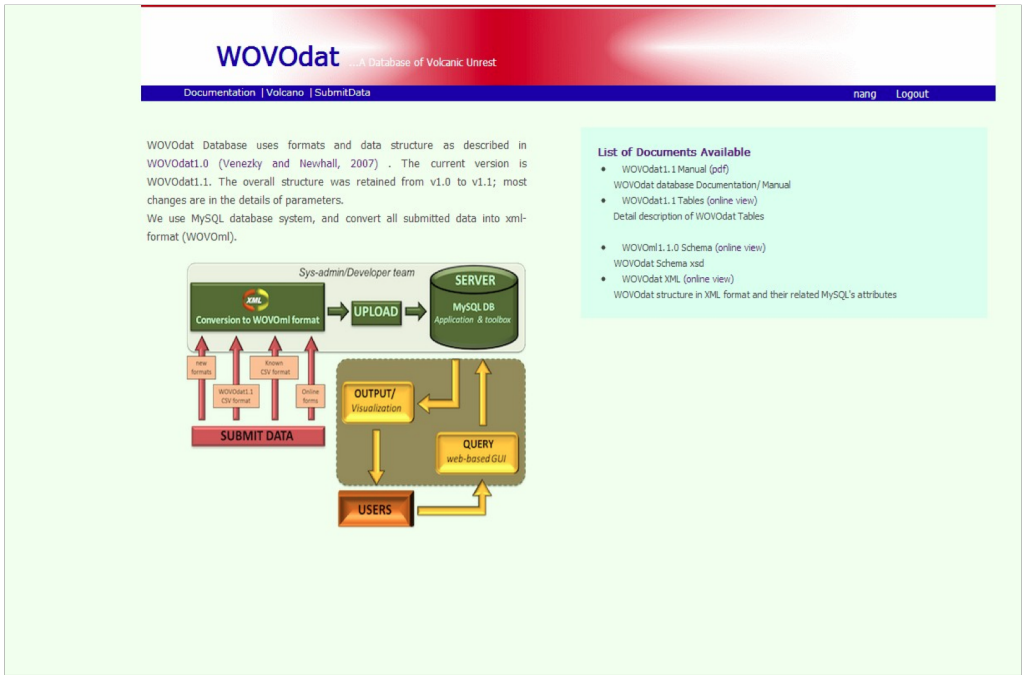


Figure 1. WOVOdat ***Documentation*** webpage

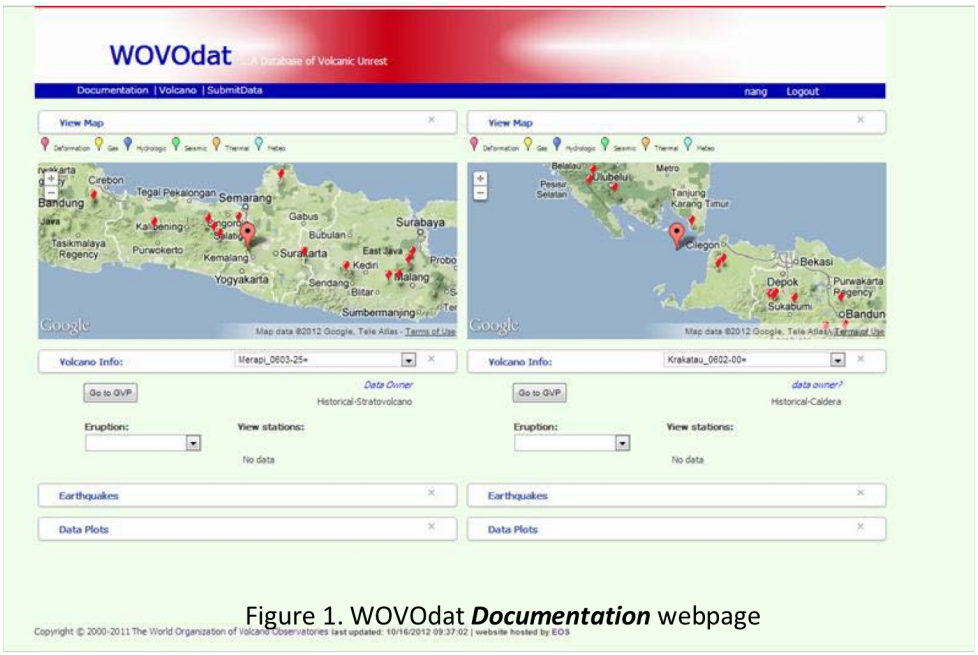


Figure 1. WOVOdat ***Documentation*** webpage

Figure 2. WOVOdat ***Visualization*** webpage

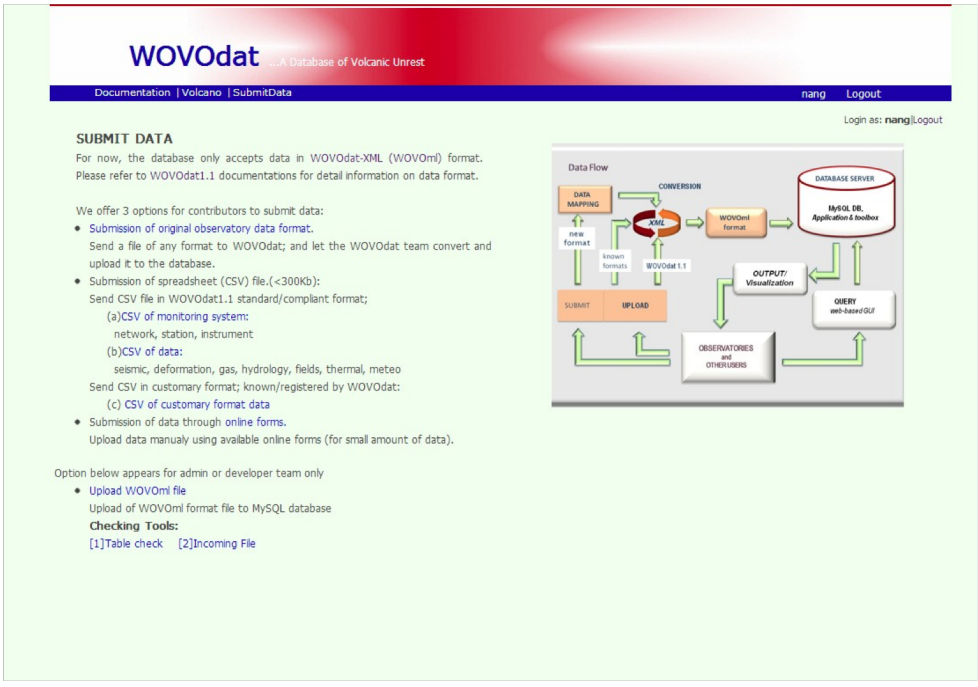


Figure 3. WOVOdat ***Submit Data*** webpage

- Uncompress the tar file under directory: /home. The whole package of scripts will therefore store under: /home/wovodat

%tar cvf wovodat_Tool.tar wovodat/PEAR (Tar command line)
% tar –xvf wovodat_Tool.tar (Untar command line)

Install WOVOdat Database

❶ Download WOVOdat database template (wovodat.sql) file from http://wovodat.org/installing/download_installable.php and save it into your favorite directory.

❷ Use web browser to go to this link http://localhost/phpmyadmin to import a database and create a new account.

❸ Log in page will appear in the web browser, as shown in Figure 3. Type in MySQL username and password.

❹ Press on 'Go' button to log in.

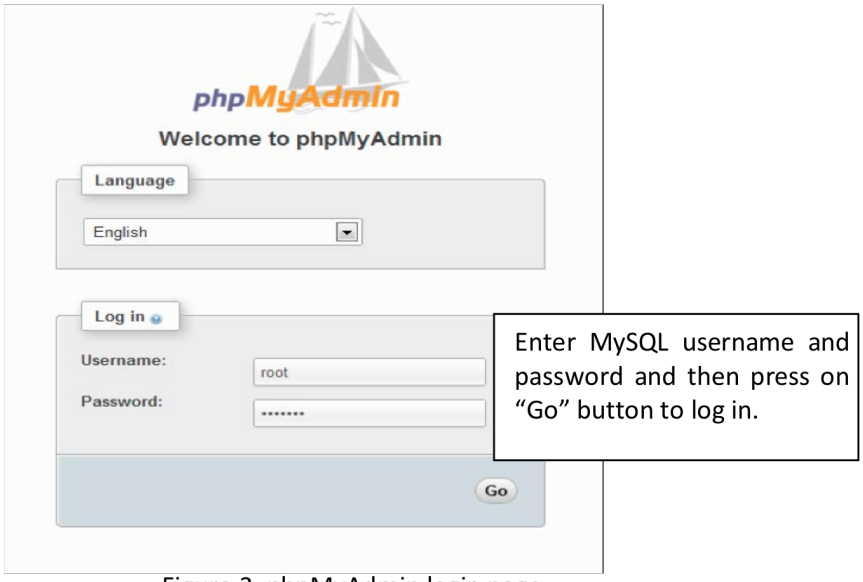


Figure 3. phpMyAdmin login page

Creating the new database and the new account using phpmyadmin

Default Database Name:	wovodatdb Default
Username:	wovodatuser
Default Password:	wovodatpassword

Note: if you want to change default database name, username and password, edit the following files:

- /home/wovodat/public_html/WOVOdat/PEAR/php/MYDB.php
- /home/wovodat/public_html/WOVOdat//PEAR/php/include/db_connect.php
- /home/wovodat/public_html/WOVOdat/PEAR/php/include/db_connect_view.php

How to import wovodat database (see Figure 4)

❶ Click on “Import” button that is at the top right frame to import “wovodat.sql” file.

❷ Click on “Browse” button to locate and choose “wovodat.sql” file from your computer and select ‘utf8’ for the character set.

❸ Click on “Go” button to import it.

❹ Now “wovodatdb” database has been installed on your system.

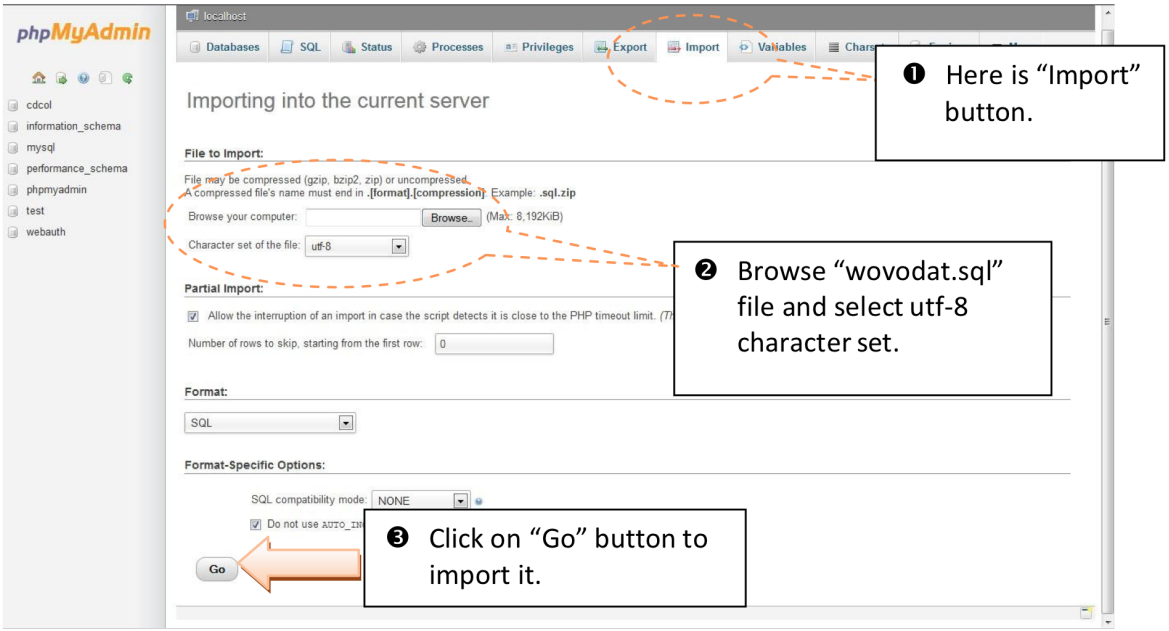


Figure 4. Importing a database into the current server using phpMyAdmin GUI

How to create a new account

Setting up new user account (see Figure 5)

❶ Click on Privileges menu that is at the left hand side panel.

❷ Click on “Add a new User” link near bottom left of Privileges page.

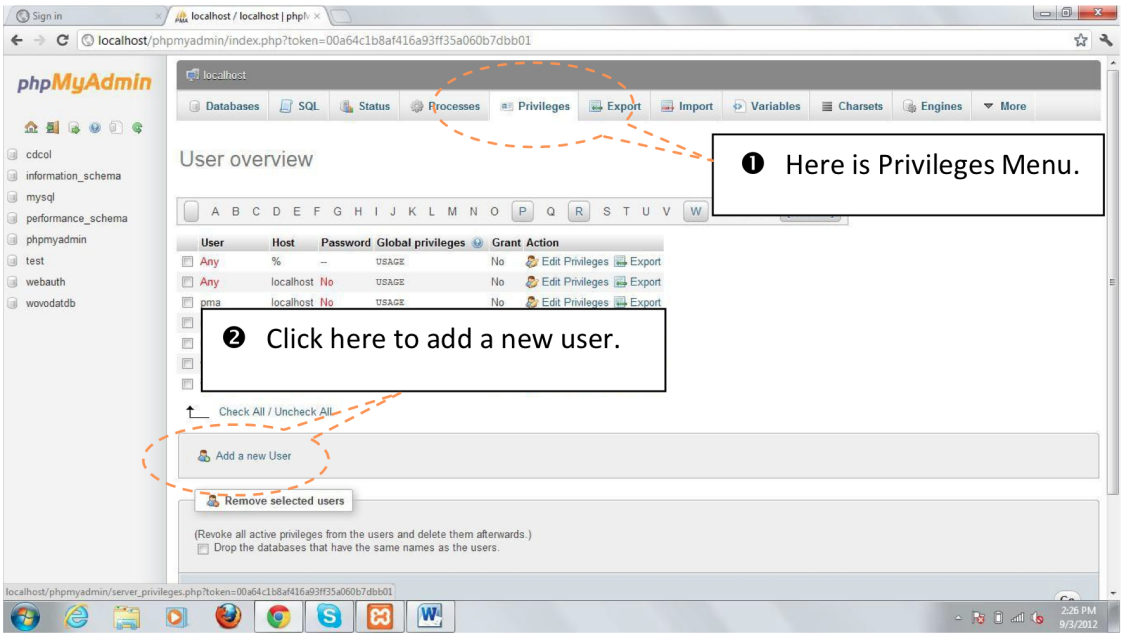


Figure 5. Create new account using phpMyAdmin GUI

Create login information and setting up privilege (see Figure 6)

❸ Choose the field category from the left hand side drop down box and then move the cursor to the right hand side and type fill in the fields.

❹ Click on 'none' radio button under "Database for user" section.

❺ Click on "Check All" beside Global Privileges to give all permissions for the "wovodatuser".

❻ There is no change under "Resource Limits" section.

❼ The last step is to click on "Create user" button to create the "wovodatuser" user account.

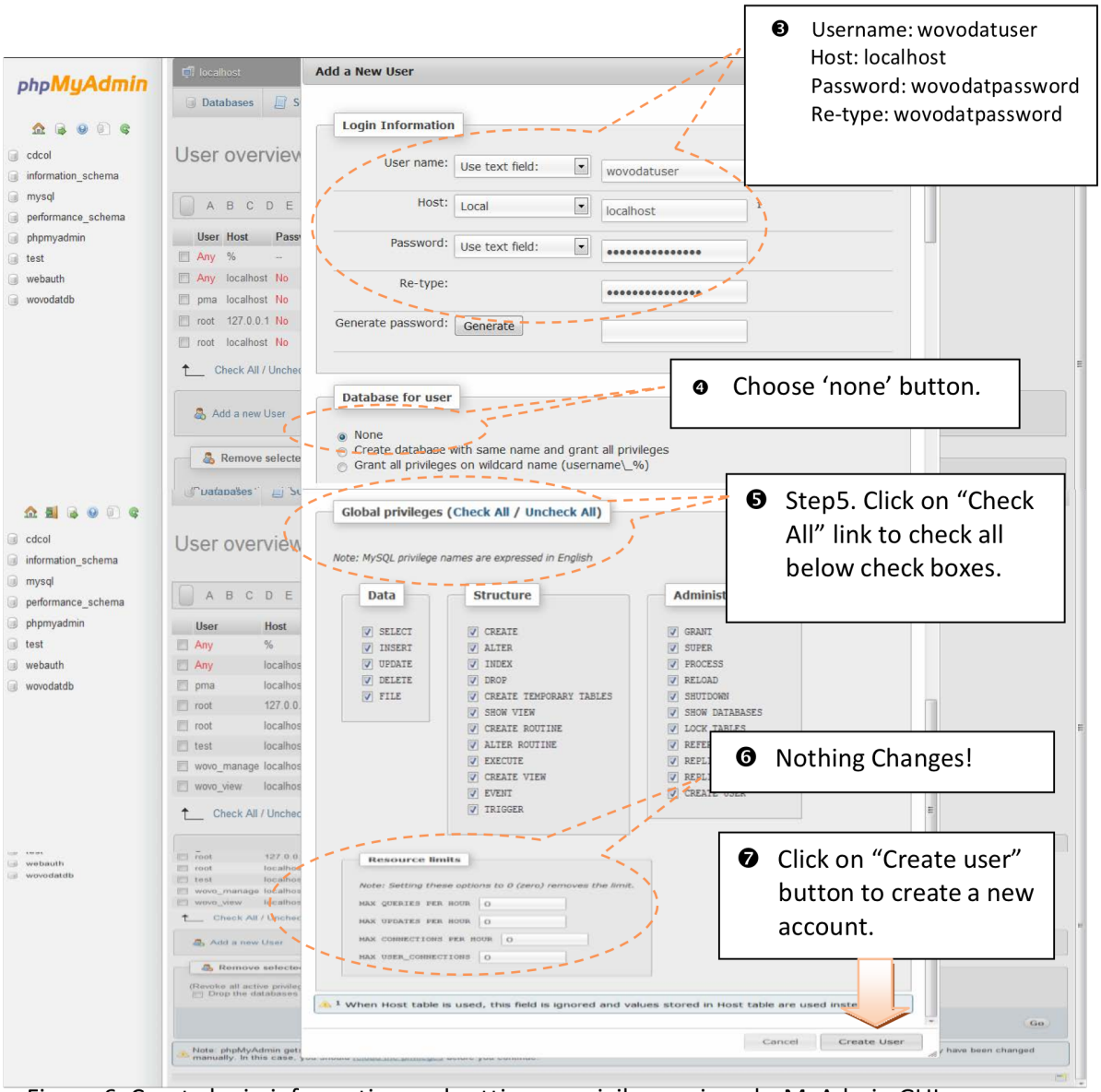


Figure 6. Create login information and setting up privilege using phpMyAdmin GUI

Configuration

After finish with the installation, the next step is to configure Apache2 and PHP5 for the WOVOdat website and the database.

- Configure the default site to **/home/wovodat/public_html/WOVOdat/**
  Edit *default* file using *vi* or other editor:

```
% sudo vi /etc/apache2/sites-available/default
      ⇨ Replace the path /var/www with
         /home/wovodat/public_html/WOVOdat/
```

- Refer to the sample default file below:

```
<VirtualHost *:80>
        ServerAdmin webmaster@localhost
        DocumentRoot  /home /wovodat/public_html/WOVOdat
        <Directory />
                Options FollowSymLinks
                AllowOverride None
        </Directory>

       <Directory /home/wovodat/public_html/WOVOdat >
                Options Indexes FollowSymLinks MultiViews
                AllowOverride None
                Order allow,deny
                allow from all
        </Directory>

        <Directory /home/wovodat/public_html/WOVOdat/output>
                Options Indexes FollowSymLinks MultiViews
                AllowOverride None
                Order allow,deny
                allow from all
        </Directory>

        ScriptAlias  /cgi-bin/  /usr/lib/cgi-bin/
        <Directory  "/usr/lib/cgi-bin">
                AllowOverride None
                Options +ExecCGI -MultiViews +SymLinksIfOwnerMatch
                Order allow,deny
                Allow from all
        </Directory>

        ErrorLog /var/log/apache2/error.log

        # Possible values include: debug, info, notice, warn, error, crit,
        # alert, emerg.
        LogLevel warn

        CustomLog /var/log/apache2/access.log combined

       Alias /doc/ "/usr/share/doc/"
       <Directory "/usr/share/doc/">
            Options Indexes MultiViews FollowSymLinks
            AllowOverride None
            Order deny,allow
            Deny from all
            Allow from 127.0.0.0/255.0.0.0 ::1/128
       </Directory>
</VirtualHost>
```

- Change the mode of the "*/home/wovodat/*"

```
% sudo chmod 755 /home/wovodat -R
```

- Change the owner of the */home/wovodat/incoming* to "www-data".

```
% sudo chown -R www-data:root /home/wovodat/incoming
/home/wovodat/region /home/wovodat/public_html/WOVOdat/output

% sudo chown www-data:root /home/wovodat/login_history.txt
```

- Edit the *php.ini* to include */home/wovodat/PEAR*

```
% sudo vi /etc/php5/apache2/php.ini
 ⇨ Modify the include_path entry as following:
include_path = ".:/home/wovodat/PEAR:/usr/share/php"
```

- Restart Apache2

```
% sudo /etc/init.d/apache2 restart
```

- Using the web-browser and type in "http://localhost". The website should appear in your web browser.

For any inquiries and comments please contact WOVOdat developer team:
http://www.wovodat.org/populate/contact_us_form.php