

Validation of seismological data from volcanological and seismological French observatories of the Institut de Physique du Globe de Paris (OVSG, OVSM and OVPF)

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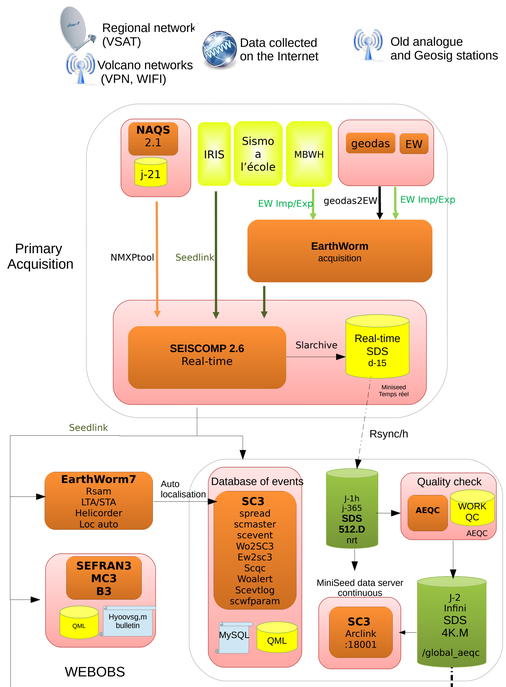
Validation of seismological data from volcanological and seismological French observatories (RESIF October 2015)

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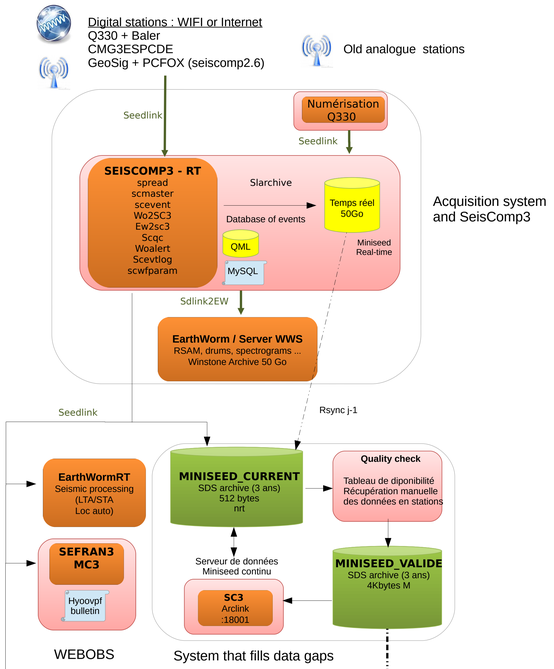
Seismic data flow

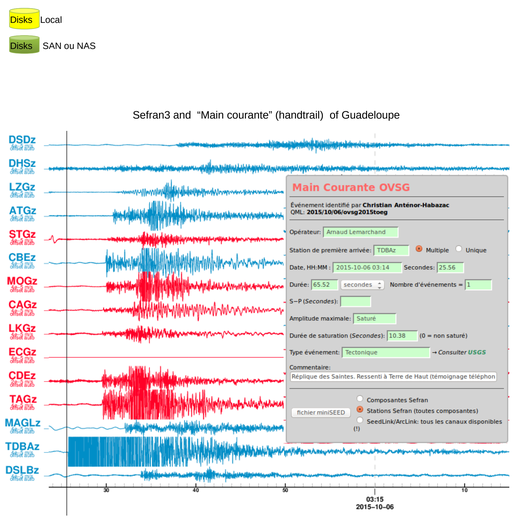
Antilles (OVSG/OVSM)



IPGP's volcanological and seismological observatories have a monitoring mission which forces them to prioritize real-time data when a disruption of communications or too low bandwidth hinder the retrieval of all the data. Thus, the real-time overtakes the completeness of data. In the case of data transmitted by VSAT or WIFI, an NAQS (Nanometrics) server manages the retransmissions of unacknowledged data but the nmxptool plugin only streams real-time data to a seiscomp server which therefore contains less complete data than get from the server NAQS. Moreover, all stations have local data backups. In the West Indies, AEQC (EM Aissaoui) is a tool that automatically completes the miniseed data by making requests in the NAQS server, in local storage or even in the arclink server of the other partner observatory (Martinique / Guadeloupe). AEQC works over a time window of 30 days, beyond that the recovery is manual in the station. In Réunion, a dashboard of available data is checked every week. Data retrieval from the stations is manual.

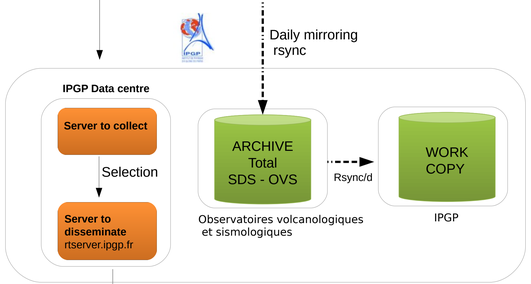
La Réunion (OVPF)





Sefran3 and "Main courante" (handtrail) of Guadeloupe

Daily mirroring rsync



Real-time stream SeedLink for
Academic partners , tsunami warning center ...

dashboard of available data - Réunion

Date	CRA HHZ	CRA HHE	CRA HHN	GBS HHZ	GBS HHN	GBS HHE	GPN HHZ
2015-08-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-13	0.01	0.01	0.01	0.00	0.00	0.00	71.84
2015-08-12	0.00	0.00	0.00	0.00	0.00	0.00	100.00
2015-08-11	0.00	0.00	0.00	0.00	0.00	0.00	100.00
2015-08-10	0.00	0.00	0.00	0.00	0.00	0.00	100.00
2015-08-09	0.00	0.00	0.00	0.00	0.00	0.00	100.00
2015-08-08	0.00	0.00	0.00	0.00	0.00	0.00	16.92
2015-08-07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-08-01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015-07-31	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Légende

Données non récupérables
Données en cours de récupération
Moins de 1% de données manquantes
Plus de 1% de données manquantes

Validation within each observatories

- Completeness of data
- Maintainance of the dataless SEED
- Mirroring in Paris of data structure (SDS) of miniseed stamped as an intermediate quality (M)

Validation before the delivery to the IPGP data center (Node A – volcanological et seismological observatories)

Organization

The volcanological and seismological observatories give a scientific training module to the STEPUP **doctoral school** which aims to train students in the validation of seismological data and metadata in SEED format. **Doctoral students** validate one year of seismological data acquired in observatories during 12 monthly sessions.
The entire validation environment and the associated analysis scripts are centralized on a single server accessible remotely for students that are not always hosted in the IPGP (eg CEA students). The validation takes place in **5 main stages**.

Step 1: validation of dataless SEED

The dataless are maintained in a version server (SVN). A version is labelled with each delivery to the data centre. Systematic checks of fields fixed by convention (blocking, compression, encoding, channel name, flags, etc.)

1. Consistency of time periods (recoveries)
2. Checking of the location (production of a kml file viewed on googleEarth)
3. Checking the consistency of orientations and channel codes
4. Checking the units of stage 1 (instruments) according to the channel code
5. Verification of the normalization frequencies of the stages (1Hz for HH and 10Hz for EH)
6. Checking channel and station comments for users
7. Analysis of verseed output on dataless
8. Systematic plotting and analysis of the instrumental responses of stages 0 and 1

Step 2: Dataless versus miniSEED

1. Detection and correction of data without defined metadata and vice versa.
2. Detection and correction of inconsistencies between file names and miniseed headers

Step 3: Validation miniSEED files (SDS)

1. Detection and correction of miniseed data whose headers are inconsistent with the dataless (blocking, compression, encoding; channel name).
2. Detection and correction of overlaps in miniseed data.
3. Gaps detection and data completeness analysis.

This step may result in the addition of comments in the SEED dataless to document the data gaps.

Step 4: Power Spectral densities : PQLX

1.Detection of sensor failures and non-seismic data (electronic noise acquisition) in the data spectrum.

2.This step can lead to the addition of comments in the dataless. The observatories had a predefined list of about twenty comments to limit the information only useful to the users.

Step 5 : Telesismic recording waveform check

Selection of three earthquake at a distance between 40° and 85° and a magnitude between 6.8 and 8.2 for each year and each geographical area (Antilles and Reunion).
The SCARDEC method to invert moment tensor is used to model the waveforms on the broad-band and medium-band stations and to compare them to the real de-convolved waveform. Comparisons detect flaws in dateless

Delivery to the IPGP data centre

1. list of validated miniseed files and ultimately stamped as a full validated data (Q)
2. a validated and labelled dataless in the SVN on the date of delivery
3. a document summarizing the corrections made during delivery
4. the logs of data verification and correction scripts