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Volcano node A : what's new and what to expect ?

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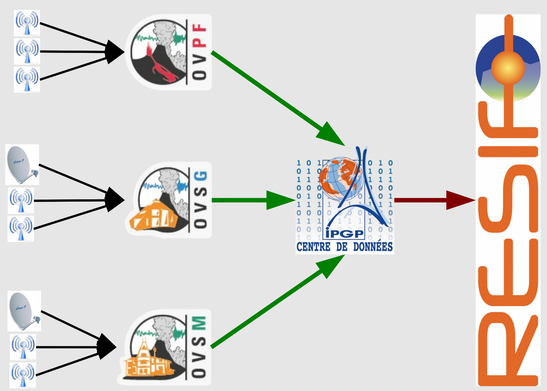
RESIF October 2017

Volcano node A collect seismological data from the 3 IPGP volcanic and seismic observatories. Those observatories operate analog short-period, digital short-period 3 component, medium-band and broad-band seismic stations.

Seismic data are distributed under 4 distinct network codes :

- WI (**180** channels) for the Antilles broad-band network (**643 GB** of available data as of 01/09/2017);
- MQ (**72** channels) for the local network in Martinique
  - (**286 GB** of available data as of 01/09/2017);
- GL (**112** chanels) for the local network in Guadeloupe
  - (**259 GB** of available data as of 01/09/2017);
- PF (**179** channels) for the local network in La Réunion
  - (**1745 GB** of available data as of 01/09/2017).

stations *observatory* *Volcano* node A *Node B*

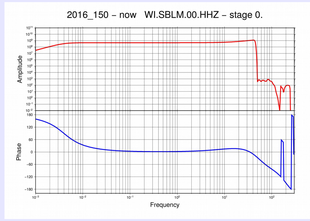


2015-2017 summary

- Validation of all the initial metadata has been performed in 2015. Since then, updates are sent routinely to node B after validation.
- Real-time data transfert to the node B is working since end of 2015 for all the qualified stations of the 4 networks. This represents around **3GB** of data per day for an average **500** channels.
- Data validation if performed yearly, within the framework of a Phd school training. Validated data are, after archival and last verifications at IPGP datacenter, sent to node B. Today, around **3TB** of data have been validated for all the networks.
- The server used for data validation has been ugraded in 2016. It allows a more rapid and efficient work.
- Centralized storage bay at IPGP have been extended at the beginning of 2017 to achieve a **40TB** capacity.
- All acquired data from all three observatories (including seismic data) are copied on an external data storage area (USPC Cumulus cloud) for safety.
- The IPGP data center virtualization platform is currently upgraded and services are being migrated from the old platform.

Volcano node A data validation

Metadata validation (dataless SEED)



- Dataless format with ***verseed***
- Channels infomations
- Stations informations
- Instrumental response drawing with ***JPlotResp***

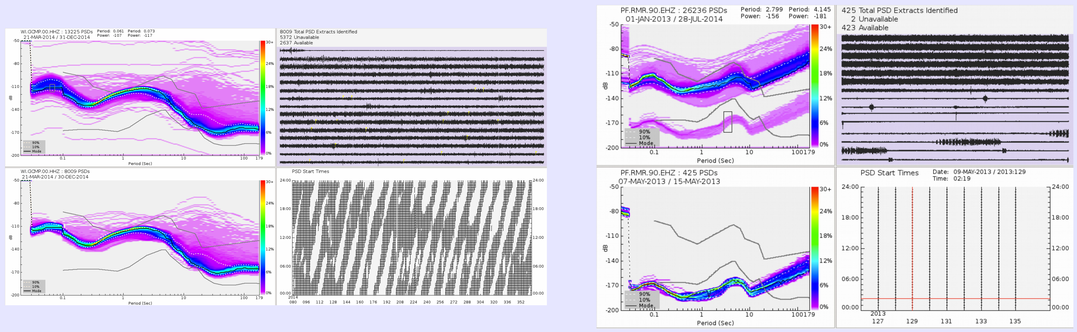
Continuous waveform validation (miniSEED)

- Gaps recovery from on-station storage
- Gap verification and data availability plot (***msi***)
- Overlap removal (***qmerge*** and ***dataselect***)
- Daily files with a minimum availability of 50 % are selected

Dataless SEED and miniSEED cross-validation

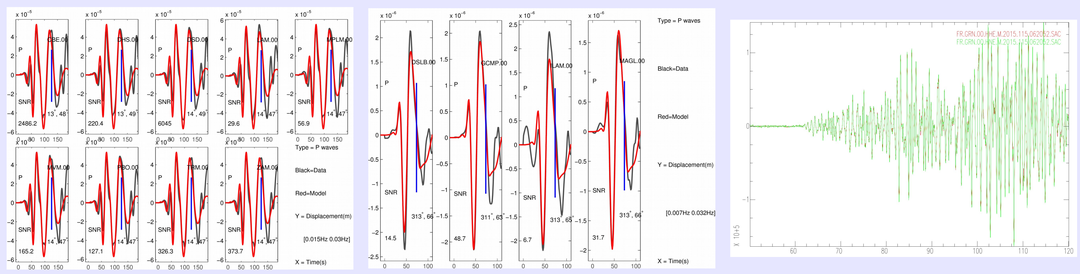
- Checks redundant informations coherency :
  Steim compression type (should be Steim2)
  miniSEED blocks length (should be 4096 bytes)

Power spectral densities calculation with PQLX and identification of bad data or bad metadata time periods



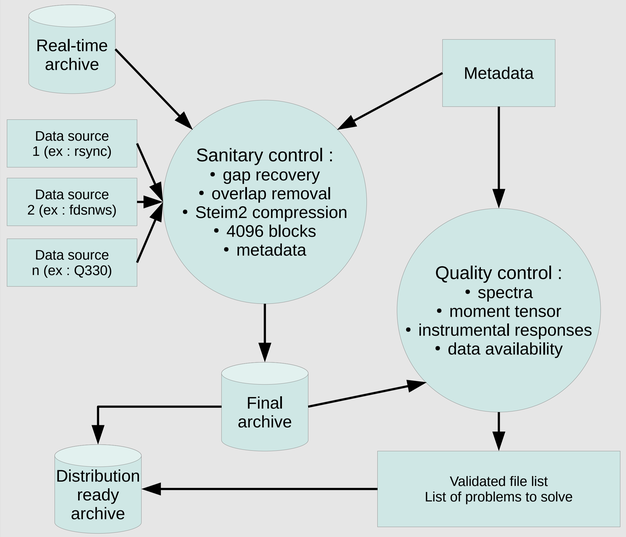
Teleseismic recordings waveform check

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 deconvolved waveforms.
For stations hosting both accelerometer and velocimeter, a comparison between the two records deconvolved as velocity is done for significant regional events.



Soon : a semi-automated validation and correction tool

In order to decrease the delays for data and metadata validation and to reduce manual workload, all semi-automatic procedures and tools in use in all 3 observatories are going to be merged and upgraded in a single software solution, with modules for future evolutions.
This development will be done by IPGP and will be funded by RESIF.



IPGP volcanic and seismic observatories are situated on tropical islands which are threatened by hurricanes. In 2017, two major hurricanes (above Saffir-Simpson category 3) have impacted the Antilles : **IRMA** on september 6th, 2017 and **MARIA** on september 18th and 19th, 2017, both category 5.

Those two hurricanes have caused damages on IPGP monitoring networks, particularly on OVSG network :

- Saint-Barthélémy broad-band station (**WI.SBLM**) has ceased transmission since IRMA eye passage.
- MARIA has damaged part of OVSG roof, leading to water invasion and electric damages on the installations.
- Some of Soufrière stations solar panels were wiped out and Wifi antennae damaged.
- VSAT reception antennae – the hub – have been damaged by MARIA. It's now out of service.

However, despite the electric shutdown in Martinique observatory (less than 24 hours) caused by rain infiltration, the vast majority of the regional broad-band network (WI network) have not been impacted. The three reception hubs (Guadeloupe, Martinique, Trinidad) design allowed to quickly route the data distribution of all the network from Martinique observatory.