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Recent evolutions of the GEOSCOPE broadband seismic observatory

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The GEOSCOPE observatory provides 36 years of continuous broadband data to the scientific community. The 32 operational GEOSCOPE stations are installed in 17 countries, across all continents and on islands throughout the oceans. They are equipped with three component very broadband seismometers (STS1 or STS2) and 24 or 26 bit digitizers (Q330HR). Seismometers are installed with warpless base plates, which decrease long period noise on horizontal components by up to 15dB. All stations send data in real time to the IPGP data center and are automatically transmitted to other data centers (IRIS-DMC and RESIF) and tsunami warning centers. Recent important improvements include a new station in Wallis and Futuna (FUTU, South-Western Pacific Ocean) and the re-installation of WUS station (China) and FOMA station (Madagascar).

Data of the stations are technically validated by IPGP (25 stations) or EOST (6 stations) in order to check their continuity and integrity. A scientific data validation is also performed by analyzing seismic noise level of the continuous data and by comparing real and synthetic earthquake waveforms (body waves). After these validations, data are archived by the IPGP data center in Paris. They are made available to the international scientific community through different interfaces (see details on http://geoscope.ipgp.fr). All GEOSCOPE data are in miniseed format but using various conventions. An important technical work is done to homogenize the data miniseed formats of the whole GEOSCOPE database, in order to make easier the data duplication at the IRIS-DMC and RESIF data centers.

The GEOSCOPE observatory also provides near-real time information on the World large seismicity (above magnitude 5.5-6) through the automated use of the SCARDEC method. Earthquake parameters (depth, moment magnitude, focal mechanism, source time function) are determined about 45 minutes after the occurrence of the event. A specific webpage is then generated, which also includes information for a non-seismologist audience (past seismicity, foreshocks and aftershocks, 3D representations of the fault motion…). This information is also disseminated in real-time through mailing lists and social networks. Examples for recent earthquakes can be seen in http://geoscope.ipgp.fr/index.php/en/data/earthquake-data/latest-earthquakes.