

Recent evolutions of the GEOSCOPE broadband seismic observatory

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The GEOSCOPE observatory provides 35 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 GEOSCOPE data center and are automatically transmitted to other data centers (IRIS-DMC and RESIF) and tsunami warning centers. In 2016, a new station has been installed in Wallis and Futuna (FUTU, South-Western Pacific Ocean), and WUS station has been reinstalled in Western China.

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 GEOSCOPE data center in Paris. They are made available to the international scientific community through different interfaces (see details on <http://geoscope.ipgp.fr>). An important technical work is done to homogenize the data formats of the whole GEOSCOPE database, in order to make easier the data duplication at the IRIS-DMC and RESIF data centers.

The GEOSCOPE broadband seismic observatory also provides near-real time information on the World large seismicity (above magnitude 5.5-6) through the automated application of the SCARDEC method. By using global data from the FDSN - in particular from GEOSCOPE and IRIS/USGS stations -, earthquake source 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 for each earthquake, which also includes information for a non-seismologist audience (past seismicity, foreshocks and aftershocks, 3D representations of the fault motion...). Examples for recent earthquakes can be seen in <http://geoscope.ipgp.fr/index.php/en/data/earthquake-data/latest-earthquakes>. This procedure has also been applied to past earthquakes since 1992, resulting in a database of more than 3000 source time functions (<http://scardec.projects.sismo.ipgp.fr/>).