

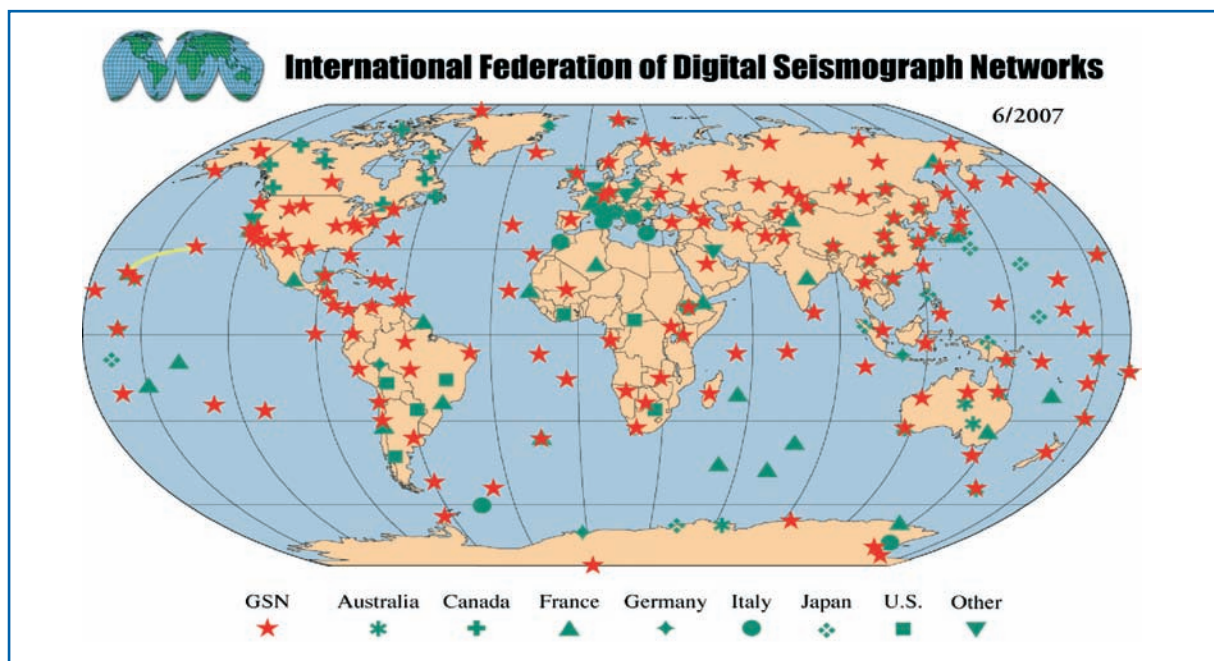
International Federation of Digital Seismograph Network: increased coverage and data availability for global earthquake monitoring

Description

The International Federation of Digital Seismographic Networks (FDSN) is the international organization that brings together the primary operators of broadband networks throughout the world. The FDSN is an effective organization to coordinate activities in station site selection, data exchange, and instrumentation standardization. The FDSN has broken the bonds which, in the past, have made it difficult to access data from a variety of networks in a common and comprehensive manner. The FDSN strives to achieve a dense coverage of high-quality broad-band stations in all regions of the world, by pooling together stations contributed by all members. A recent focus is the availability of real-time waveforms from selected stations worldwide. The FDSN primary archive is hosted by the IRIS Data Management Center in Seattle; in addition, most FDSN members allow open access to waveform data at their data centers.

The FDSN is an independent organization and has commission status within the International Association of Seismology and Physics of the Earth Interior (IASPEI/IUGG/ICSU). In February 2005, the FDSN was one of the international organizations signing the GEOSS (Global Earth Observation System of Systems) 10-year Implementation Plan, in recognition of the important role of seismology in the priority area of natural hazards monitoring. Within GEOSS, the FDSN can effectively represent the interests of all countries in a coordinated global policy.

FDSN members include the global networks operated by the US (GSN/IRIS), France (GEOSCOPE) and Germany (GEOFON). These supplement the national networks to serve as the principal global data source for earthquake response and tsunami warning, and contribute to nuclear treaty monitoring.



In 2005-2007, the FDSN has more than doubled its national membership, as digital broadband networks are installed in more countries around the world to replace obsolete technology. Key areas of recent development are Central Asia, South America, Africa and SE Asia. In addition, the availability of real-time data streams from in-situ observing system continues to improve, as well as the worldwide exchange of seismic waveform. For example, over 900 BB stations are now installed in the Euro-Mediterranean network, and the number of open stations is expected to increase from the present 160 to over 500 by 2009; all parameters and open waveforms are exchanged and made available worldwide through a hierarchy of international data centers (EMSC, ORFEUS, and the FDSN archive at DMS/IRIS).

Added Value

How will GEO aid this effort, how will it impact GEO and be impacted by GEO?

In the *GEO 10-Year Plan Reference Document* the seismograph in-situ observing system and the GSN were recognized as a key observation system in its role for tsunami warning following the Sumatra Earthquake and Indian Ocean tsunami disaster. The data availability has now much improved.

Subsequently, GSN real-time telemetry has been enhanced at over 30 sites globally, and 9 new GSN stations have been installed in the Caribbean, Indian and Pacific Oceans, and central Asia to support tsunami warning and earthquake disaster response. Currently, over 1 Terabyte/yr of real-time GSN data are used by Tsunami Warning Systems internationally.

The joint collaboration of the FDSN members in GEO provides a global infrastructure for in situ observations, integrated data management, and products for the Societal Benefit Area of Disasters associated with the hazards of earthquakes and tsunamis. This GEO framework has strengthened international coordination between GSN/FDSN observing and data managements systems with products organizations (US National Earthquake Information Center, European Mediterranean Seismological Centre, and Intergovernmental Oceanographic Commission Tsunami Warning Systems). These systems currently provide data and products for Societal Benefits in near-real time to GEO Members, Participating Organizations, and the public via a diverse communications network, and are an existing international model of a successful community of practice for GEO.

The GEO work plan focuses on sustaining and improving these systems, enhancing open real-time access to data and products, and advocating synergy with other in situ observing systems on land and in the oceans. The GEO framework of international coordination is essential to the health and function of seismological observing systems, and is needed to help overcome obstacles in data sharing.

GEO Work Plan reference (Societal Benefit Area: Disasters)

- Seismographic Networks Improvement and Coordination, Task DI-06-02
- Implementation of a Tsunami Early Warning System at Global Level, Task DI-06-04

Participants

Countries: Austria, Bulgaria, Czech Rep., Denmark, France, Germany, Greece, Hungary, Iceland, Italy, Norway, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Australia, Azerbaijan, Dubai, China, Georgia, Indonesia, Iran, Israel, Japan, Malaysia, New Zealand, Taiwan, Tajikistan, Thailand, Canada, Chile, Ecuador, Jamaica, Mexico, Puerto Rico, Egypt, South Africa, Kirghyzistan, Kazakhstan, Uzbekistan.

Current Status and Next Steps

- GSN and FDSN seismic stations provide broad, extensive coverage over all continents and on oceanic islands. Data availability of the GSN is better than 85%, and more than 90% of stations are openly available in real-time. Data availability in many national networks approaches 99%, and data availability through the international data archiving system is rapidly improving.
- Long-term continuity – GSN and FDSN carry the torch for the 100-yr tradition of international cooperation in global seismology. Sustaining the networks is fundamental.
- The FDSN strives to complete the global coverage and country participation in areas such as Africa and South America; to instrument the ocean floors; to integrate seismic sensors with multi-parameter observatories in remote areas for tsunami warning and environmental monitoring.