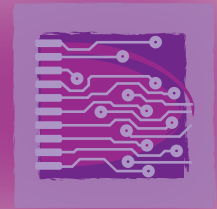




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# NERIES: Network of Research Infrastructures for European Seismology

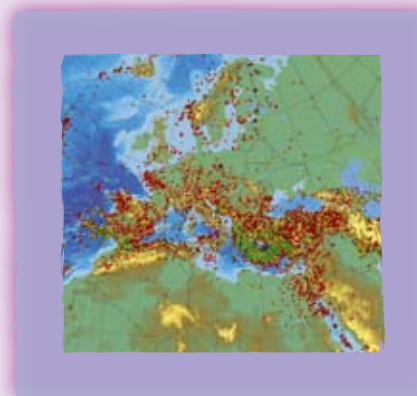
Earthquakes are perhaps the most devastating of all natural hazards facing mankind. They are also among the hardest to observe and understand. Just like the fault lines running through geological strata, Earth science infrastructures are highly fragmented and marred by a lack of structured policy for European-wide access or coordinated actions. As these infrastructures become more complex and expensive, and the need to mitigate the effects of seismological processes becomes a global priority requiring a concerted, dedicated, and international approach, a European strategy is urgently needed. One laudable example of coordination comes from NERIES, the Network of Research Infrastructure for European Seismology, which is building the core of a pan-European-Mediterranean cyber-infrastructure to study the Earth's structure. The project also feeds into major international initiatives of key importance for Earth observation and environmental policy-making and disaster preparedness. NERIES supports a key land-based segment of the GMES (Global Monitoring for the Environment and Security) strategy and of the Group on Earth Observations (GEO) 10-year implementation plan.

## ● FEELING THE EARTH MOVE

Earthquakes are recorded in the European-Mediterranean region by over 100 seismic monitoring systems and observatories in 46 countries. Together they host over 1 700 short-period (SP) and 380 broadband (BB) permanent seismic stations, operated by nearly 100 networks and observatories, like pieces of a complex mosaic with a mixture of instrumental strategies and data distribution approaches. These observatories analyse and exchange data on a national and regional scale with the key objective of monitoring the seismic activity and the earthquake hazard in their region. The same data also provide the primary input for earthquake studies and investigations of the Earth's structure to the whole European and global seismological and geophysical community.

By 2009, over 1 000 new digital accelerometers, 2 000 analogue accelerometers, 1 700 short-period seismometers and up to 800 permanent broadband seismic stations have been deployed in the Euro-Med region. This unprecedented recording capacity opens up new opportunities but also brings new challenges, and requires a higher level of networking and access.

Seismological infrastructures increasingly distribute earthquake data and products on-line directly to the scientists, operators and data centres that archive and process the data. Only in the case of a few key specialised seismological facilities, unique in Europe, is access provided through direct work at the infrastructure. To help further the integration process, two pan-European organisations have been set up - the European-Mediterranean Seismological



*Seismicity map of the European-Mediterranean area*

Centre in France (EMSC), which was founded in 1976 to collect earthquake parameters, compile earthquake bulletins and provide rapid alert on a European scale, and ORFEUS (Observatories and Research Facilities for European Seismology), which since 1987 has served as a focal point for the collection and distribution of digital waveforms among networks and for the research community. Together, these two non-governmental organisations at the heart of the NERIES project represent more than 100 institutional participants/members in over 50 countries in Europe and its near neighbours.

## ● SEISMOLOGY GOES ON-LINE

The chief objectives of the NERIES project are to bring together the main partners in seismology from the user and infrastructures communities to facilitate cross-disciplinary fertilisations in research and expand the geographical availability and quality of seismological data. NERIES is developing synergies and complementary capabilities among operators of similar seismological infrastructures in order to improve researchers' access to data and key specialised facilities.

NERIES combines Networking, Transnational Access and Joint Research Activities to promote improved access to distributed databases, common protocols, standardised procedures and strategies for long-term archiving and distribution of seismological data and develops a new generation of hazard- and risk-assessment tools designed to improve monitoring and understanding of the earthquake process. It uses e-Science technology to facilitate outreach to the public at large and educational institutions in particular. A single portal is available using new information

technologies to provide remote access to all classes of seismological data to the wider research community. Archives of data of high significance for seismic hazard assessment, such as historical instrumental records, earthquake damage intensity data and strong-ground motion recordings, are combined.

Key joint research projects under NERIES aim to improve the service provided by existing infrastructures and the use of seismological data for scientific research, including broad interaction with other geoscience fields.

In a nutshell, NERIES is investing in capacity-building and technology transfer to ensure access to modern technologies for infrastructures for the scientific community in the Euro-Med region, thus boosting its capability to investigate earthquake processes and the Earth's structure and dynamics. It also does much to strengthen the role of European seismology in global seismic monitoring and hazard mitigation.

## ● NETWORK OF RESEARCH INFRASTRUCTURES FOR EUROPEAN SEISMOLOGY IN SUMMARY

**Project acronym:** NERIES

**Funding scheme (FP6):** Integrated Infrastructure Initiative (I3)

**EU financial contribution:** €12.1 million

**EU project officer:** Brigitte Weiss

**Duration:** 48 months

**Start date:** 1 June 2006

**Completion date:** 31 May 2010

**Project webpage:** <http://neries.knmi.nl>

**Coordinator:** Domenico Giardini, ORFEUS/Swiss Federal Institute of Technology, [Domenico.giardini@sed.ethz.ch](mailto:Domenico.giardini@sed.ethz.ch)

**Partners:** Observatories and Research Facilities for European Seismology (ORFEUS), Swiss Federal Institute of Technology, Institute of Geophysics (CH), European-Mediterranean Seismological Centre, Bruyères-le Châtel (FR), Royal Netherlands Meteorological Institute (NL), Faculty of Geosciences Utrecht University (NL), Commissariat

à l'énergie atomique (FR), Laboratoire de Géophysique Interne et Tectonophysique, Université Joseph Fourier (FR), Institut de Physique du Globe de Paris (FR), GeoForschungsZentrum Potsdam (DE), Universität Potsdam (DE), Istituto Nazionale di Geofisica e Vulcanologia (IT), Servizio Sismico Nazionale – Dipartimento della Protezione Civile (IT), Imperial College of Science, Technology and Medicine (UK), Natural Environment Research Council (UK), NORSAR (NO), Institute of Engineering Seismology & Earthquake Engineering (EL), Kandilli Observatory and Earthquake Research Institute (TR), Fundação da Faculdade Ciências da Universidade de Lisboa (PT), Instituto Superior Técnico (PT), Institut Geològic de Catalunya (ES), Alfred Wegener Institute for Polar Research (DE), University of Liverpool (UK), National Institute for Earth Physics (RO), Zentralanstalt für Meteorologie und Geodynamik (AT), National Observatory of Athens – Institute of Geophysics (EL)