

Infrastructures in Earth Sciences

Prof. Domenico Giardini

Chairman, Department of Earth Sciences, ETHZ

Coordinator, EU FP6 I3 NERIES

ECRIUK Nottingham
December 6-7, 2005

ECRIUK 6.7.12.2005
D. Giardini, ETHZ

5 classes of infrastructures in Earth Sciences

- *Basic level*
- *High level*
- *National surveillance*
- *Euro-class facilities*
- *Natural laboratories*

ECRIUK 6.7.12.2005
D. Giardini, ETHZ

Basic level

Basic infrastructures which each Dept/research center has to have, for teaching and basic research

XRD, XRF, microprobe, stable isotope, chemistry lab, rock preparation, mineral separation, ion chromatograph, ICP MS, SEM, sedimentology lab, optical microscopes, fluid inclusions, Raman, GC/MS + lab organic chem, grain size analyzer, modeling computers

Cost 6'000 KEuro

⇒ **No coordination required**

ECRIUK 6.7.12.2005
D. Giardini, ETHZ

High level

High-end infrastructures required for top research and development, to be located/distributed in few centers

Ar/Ar dating, other noble gases, MC ICP-MS, TIMS, clean labs, add. stable isotopes, HP petrology lab, rock deformation lab, fission track dating, microbiology lab, lake research, XRF core scanner, high resolution MC ICP-MS, ion probe, nano sims, accelerator MS for C-14 and cosmogenic radionuclides, high-end computers, applied geology, seismic processing, eng. geophysics, portable seismic BB+SM, portable GPS, geotechnics lab, analogue experimental lab, geo/rock mag lab

Cost 35'000 KEuro

⇒ **National and European coordination required**

ECRIUK 6.7.12.2005
D. Giardini, ETHZ

Monitoring infrastructures

National infrastructures for surveillance of natural processes and environment, GEO

National seismic networks (BB+SM)
European and national geodetic backbone (GPS)
Meteo, snow, avalanche monitoring
Earth observation satellites
Ocean-bottom observatories and cable networks

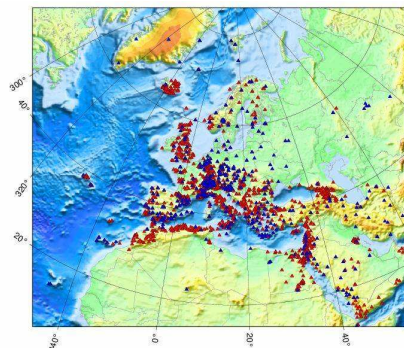
⇒ **European coordination and investment required**

ECRIUK 6.7.12.2005
D. Giardini, ETHZ

Euro-Mediterranean seismological infrastructures

National and regional backbone for earthquake surveillance and seismic hazard assessment

**46 countries
150 networks
800 BB stations
1800 SP station
3000 SM station**



EC FP6 I3

NERIES Network of Research Infrastructures for European Seismology

9 Networking Activities
5 Transnational Access Activities
5 Joint Research Activities

25 partners
Enlarged ORFEUS and EMSC communities

EC contribution: 12.1 MEuro

Timescale: 4 years, start April 1, 2006

Orfeus

EMSC

Euro-class infrastructures

European infrastructures established and maintained for Earth sciences

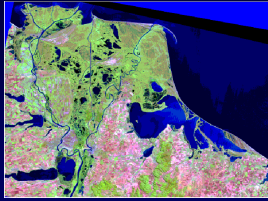
IRIS, Earthscope (100+ MEuro facilities; US, Japan, China)
Earth observation satellites
Ocean-bottom observatories and cable networks (Neptune, US)
Large geochemistry and high-pressure petrology labs
Earth simulator (Japan)
Computation Infrastructure for Geodynamics (NSF/US)

⇒ European investment required

EURUK 4.7.12.2005
D. Gordin, ETIC

Natural laboratories

Unique European natural systems to study integrated Earth and environmental problems



Danube delta

Sedimentation, floods, erosion, water cycle, environment



Alpine valley

Glaciation, erosion, permafrost, natural hazards, landscape ev.

EURUK 4.7.12.2005
D. Gordin, ETIC

Natural laboratories

Unique European natural systems to study integrated Earth and environmental problems



Corynth strait

Tectonics, earthquake cycles, forecasting, paleoseismology



Vesuvium

Volcanology, petrology, risk assessment, early warning

EURUK 4.7.12.2005
D. Gordin, ETIC

5 classes of infrastructures in Earth Sciences

- Basic level ⇒ no requirements
- High level ⇒ nat + EU coordination
- National surveillance ⇒ EU coord/investment
- Euro-class facilities ⇒ EU investment
- Natural laboratories ⇒ EU investment

EURUK 4.7.12.2005
D. Gordin, ETIC