



European Geosciences Union General Assembly 2011

Vienna Austria 03 – 08 April 2011



The European experience of educational seismology

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General Objectives



Educational

introducing in high schools the use of advanced instruments and experimental methods which are usually applied in research laboratories

Scientific

training high school teachers and students on the acquisition, analysis and interpretation of seismological data

Social

using the seismological observations as a vehicle to learn about the dynamics and evolution of the Earth and create public awareness about the seismic activity and hazard.

Seismology at School in Europe: History of instrument deployment

- **1994:** Birth of PEPP project in USA. (Guust Nolet and Robert Phinney of Princeton University)
- **1996:** Birth of EduSeis project in Europe
 - The first stations were installed in Provence-Cote-d'Azur France and in Italy at the "Science Centre" of Naples.
- **1998** Five stations were installed in Portugal
- **1999:** Ten stations were installed in Southeast of France
- **2000:** Several stations were installed in Southern Italy
- **2004:** Five stations were installed in Greece
- **2006:** The program "SISMOS à l'Ecole" has extended the educational seismological network throughout the whole France
- **2007**
 - UK School Seismology Project
 - Seismo at school in Switzerland
 - O3EProject: several stations were installed in Northern Italy, Switzerland and France
- **2009:** Seismology Pilot program in Ireland
 - databases of UK, Ireland and USA merged
- **2011:** Nera Project: Networking School Seismology programs (France, Switzerland, Italy, UK)

Two complementary approaches in educational seismology

The first one has an immediate impact, and it is strongly **based on traditional communication supports** (booklets, brochures, web sites, videos, large public seminars and conferences)

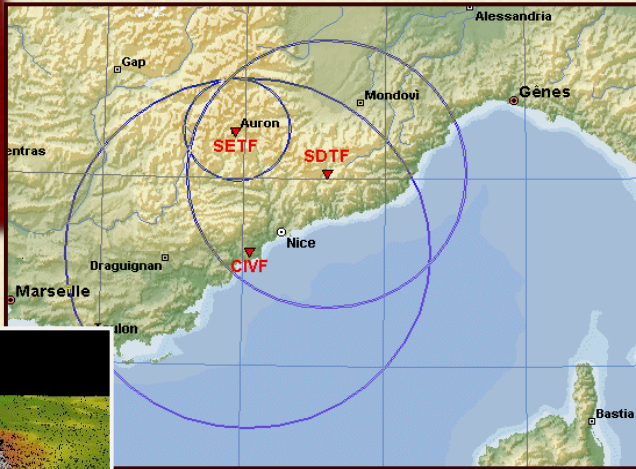


The alternative approach is **grounded on advanced technologies** by the implementation and use of web-oriented accessible tools, which provide a direct link with the modern laboratory systems of data analysis and modeling

Didactic Activities: from seismic data analysis to lab experiments

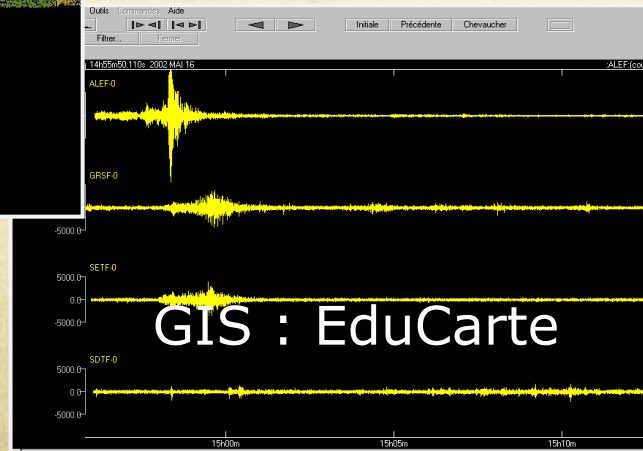
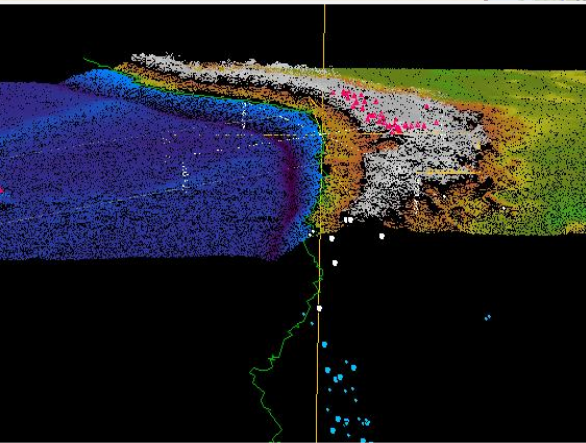
using seismological data

Once data have been collected and published on the web, learning activities can start.



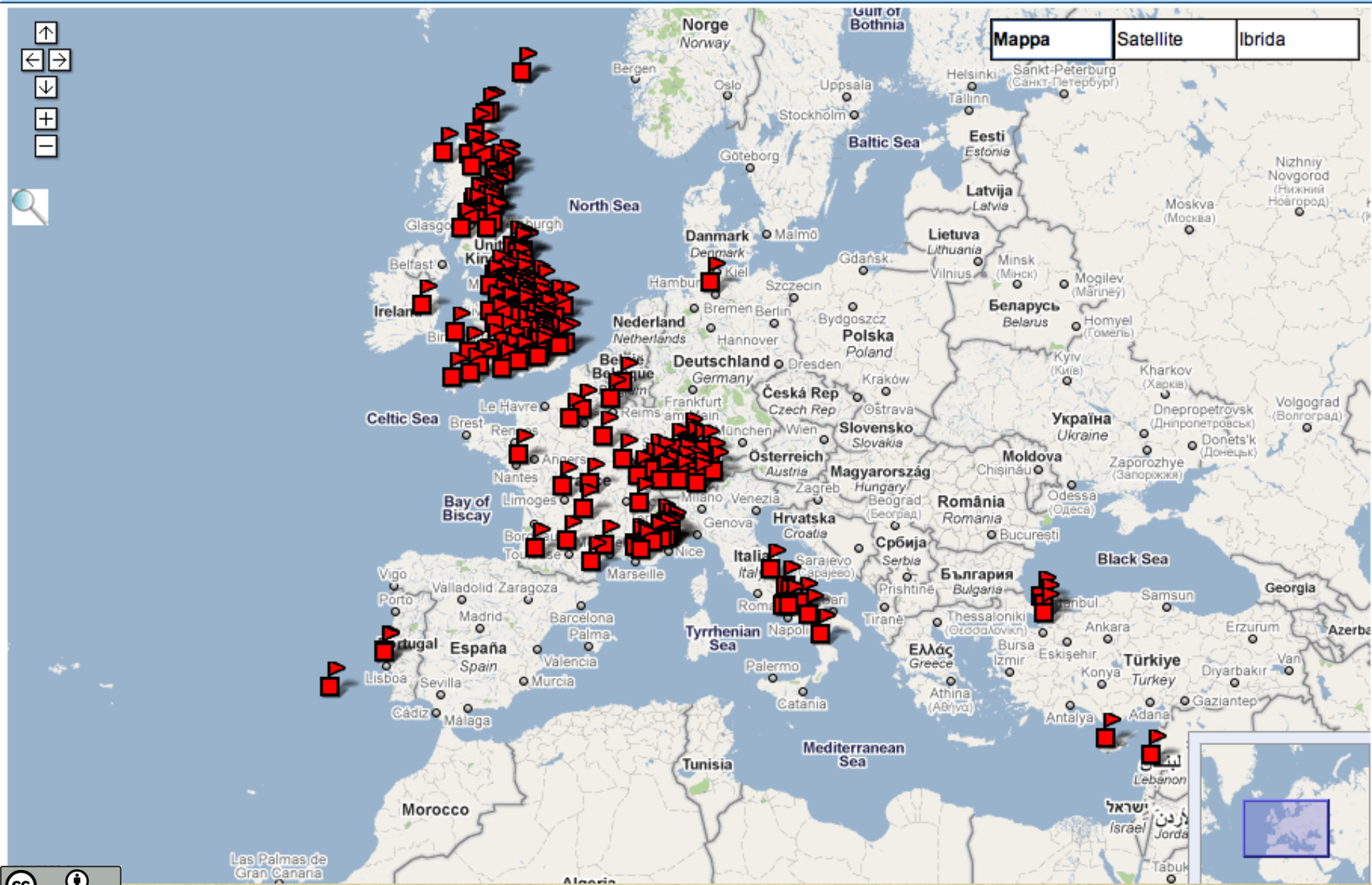
and experimenting educational tools in the lab

Various installations, scale models, simulation and experiments are designed and carried out.



Last Decade: Distribution of seismic stations in Europe

Stations on Google Map



European projects: typologies and financial supports

Country	Financial support	School Type	# Schools	Researcher Institutes
Italy	Department of Civil Protection, INGV; European	Secondary and High schools	15	Universities, INGV
France	European and National	Secondary and High schools	60	CNRS, Geoazur
Switzerland	European and national	Secondary and High schools	28	ETH
UK	UK Financial Support: Geological Survey Charities Oil Companies Universities	Secondary schools	150	British Geological Survey, UK Universities
Portugal	National	Secondary and High schools	5	University of Lisbon
Greece	National	High schools	5	Patras Seismological laboratory
Ireland	National	Secondary schools	50	DIAS, BGS, IRIS

Highlights Of European experiences

Sismalab



✓ SismaLab in Science Centre of Naples

✓ is an interactive laboratory about 30 m² equipped with six multimedia graphic stations and an adjacent meeting point room for real-time teaching/learning activities.

Sismalab: for 1 year of activity

- ❖ 333 hours of activities
- ❖ 70% primary-middle school classes
- ❖ 30 % high school classes
- ❖ # of Students: about 6400
- ❖ # of Teachers: about 250 (Physics, Science, Mathematics, Informatics)
- ❖ Teaching Assistants: 4 students in Physics

An E-learning experiment using EduSeis

THE EDUSEIS PROJECT IN ALPI PLATFORM AT ITIS "MAJORANA"

THEORETICAL PHASE

1° phase: apprentices

each group works
on a didactic EduSeis unit

2° phase: teachers

each group is split in
5 new groups

APPLICATION PHASE (DATA ANALYSIS)

3° phase: scientists

each group goes back to
the original composition



The Jigsaw Method

*Jigsaw is
a multifunctional
structure of
cooperative
learning.*



Itinerant exhibition and conferences

10 editions since 2004

Standard activities: tour of the exhibition, short conference, instruments show, laboratories and tutorial activities

Student of every age and skills, with different languages and technical contents

an educational programme for schools,
focusing on major natural hazard,
through scientific et technological approach

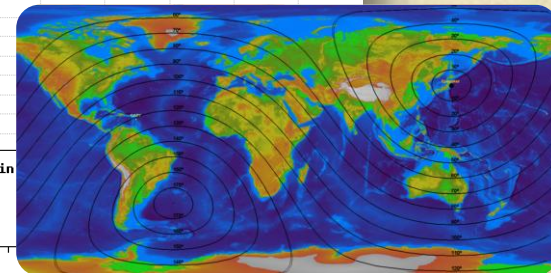
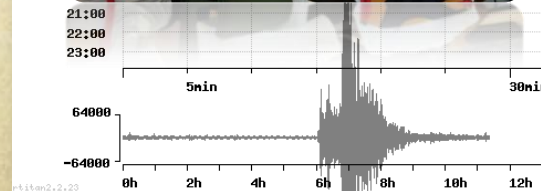
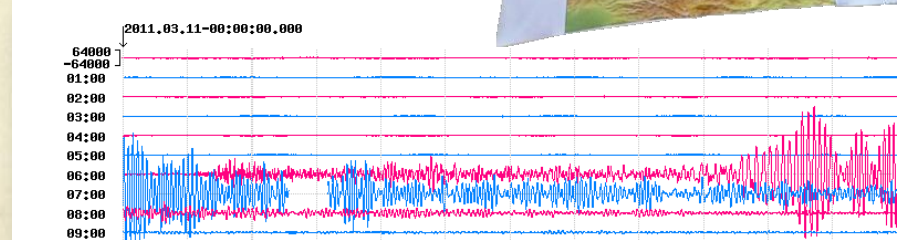
1. Edusismo - an educational network

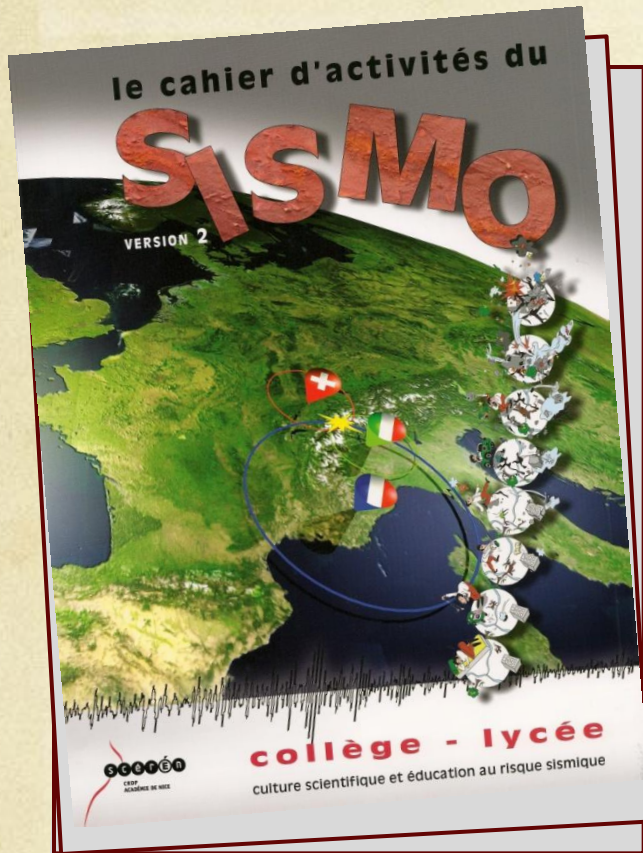
2. Students on work – themes
for investigation

3. Stay in touch – web site and
seismo tools

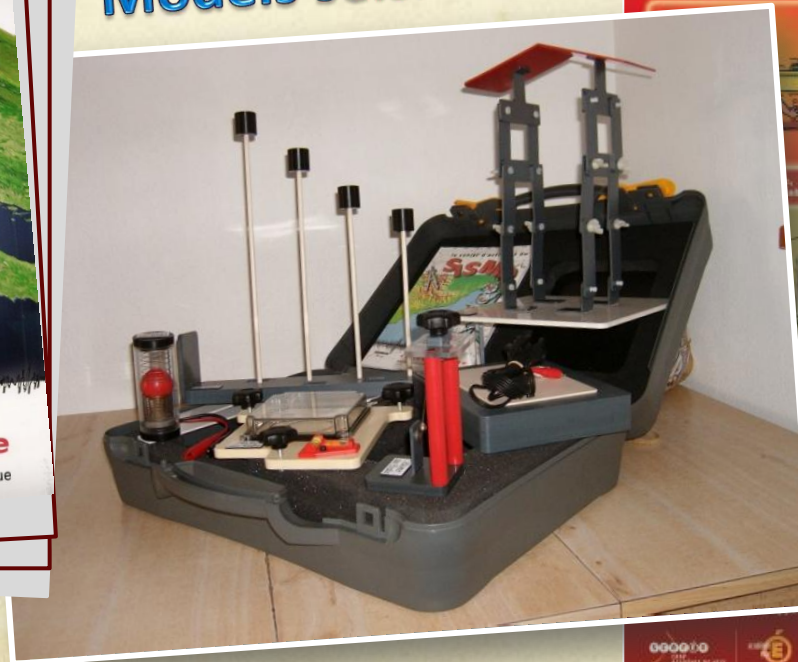


GABY mouvement du sol en continu pour le jour 2011.03.11

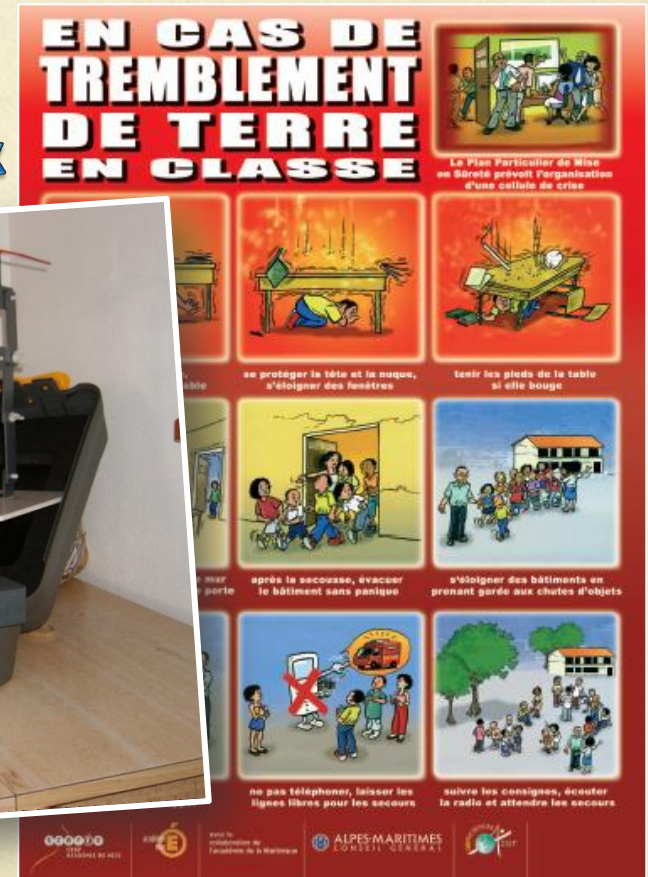




Models seismo box



Seismo Cookbook



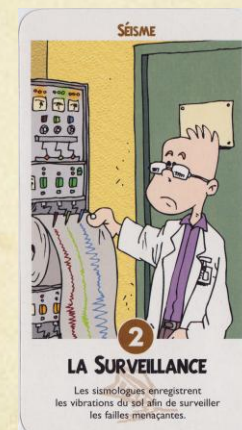
Posters for prevention



SWITZERLAND

Seismo@School is a program who provides data, activities scientific information intended to help school teachers and study earthquakes around the world and specially in Switzerland

- Seismo@School network
- Seismo@School data: real time and events
- Seismo@School education: website, lectures, teacher's training, experiments, activities, supports documents.....



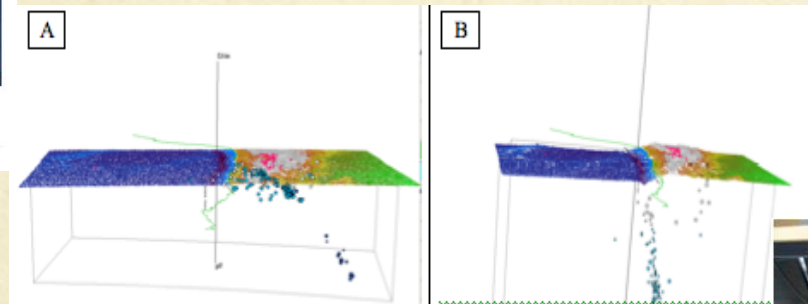
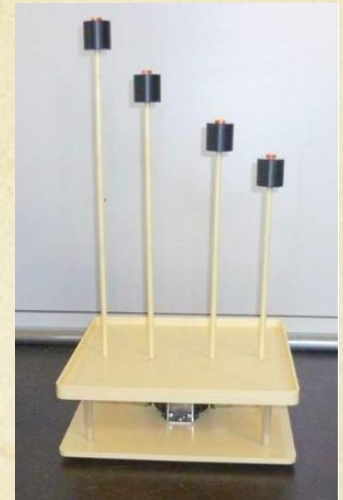


SWITZERLAND

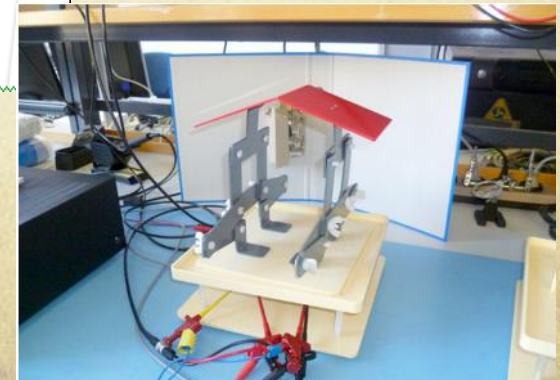
Seismo@School: Do it yourself!



Website



Experiments



A British Geological Survey educational project in Earth Sciences, carried out in cooperation with IRIS

Increase the awareness of geosciences in secondary schools as a scientific discipline and a potential career or university choice.

A training session (1 day) for teachers on seismology and how to set up and use the SEP seismometer system in their own school.

In total the project has trained teachers from approx 280 schools all of whom have a seismometer system

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Learning & popular geology

Educational resources

School seismology

- Earthquakes and data
- Stations
- Resources
- Contacts
- News

UK School Seismology Project 'real science with real data'

The school seismology project enables schools to detect signals from large earthquakes happening anywhere in the world.

The sheer destructive power of earthquakes has always held a fascination for children. This project capitalises on this natural interest by making use of earthquakes and seismology as a unifying theme to teach a range of basic science concepts.

- detect world earthquakes in the classroom using a [simple seismometer system](#)
- exchange your [Earthquake data](#) with schools around the world
- use seismology to teach geography and physics lessons with our [classroom resources](#) developed with the [SEP](#)
- NEWS!** [Japan Earthquake — March 2011](#)

Latest earthquake

Key:

- Earthquake in Off The East Coast Of Honshu, Japan
- Stations that have recorded data for this quake

Date	Time	Location
29/03/11	10:54.33	Off The East Coast Of Honshu, Japan

Magnitude	Latitude	Longitude	Depth
6.3	37.411	142.2513	18.2

Supported by

PES GB
Petroleum Exploration Society of Great Britain

IRIS
Incorporated Research Institutions for Seismology

Seismology at school: strong and weak points

Strong

- “Learning by Doing” approach applied to earthquake and wave propagation phenomena
- Enhancing and stimulating the cooperative work
- Making students acquainted with the seismological laboratory practice, data measurement, analysis and modelling.
- The simplicity and cheapness of equipment has allowed its distribution to a very large number of schools, the overall aim being to change the perception of geosciences in schools across the country.

Weak

- Difficulty to involve teachers at zero-cost, in extra-curricula activities
- The management and maintenance of the seismic station needs a continuous effort and engagement
- Small flexibility to use school time and spaces and insufficient resources (informatics, tools, instrumentation..)
- With such a large number of schools it is difficult to provide detailed one-one support for teachers with problems. The simplicity of the equipment means that the data cannot be used for scientific research.

NERA PROJECT

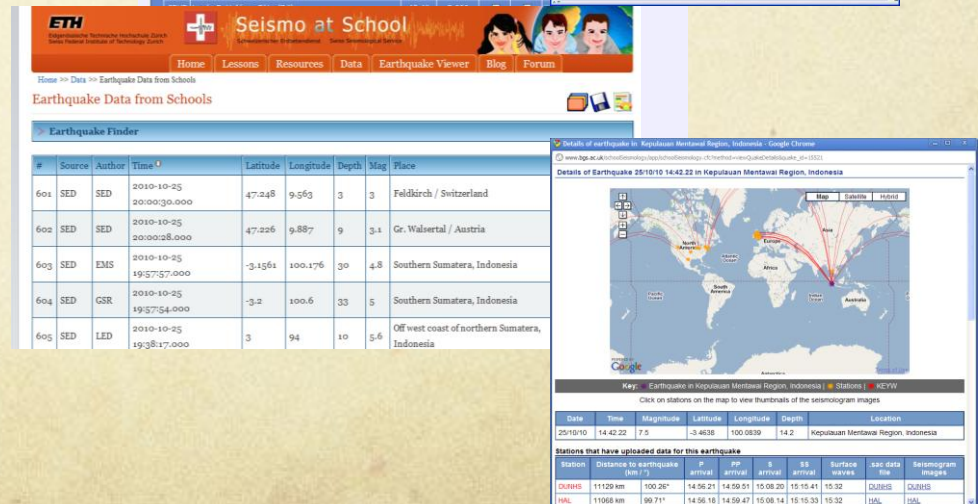
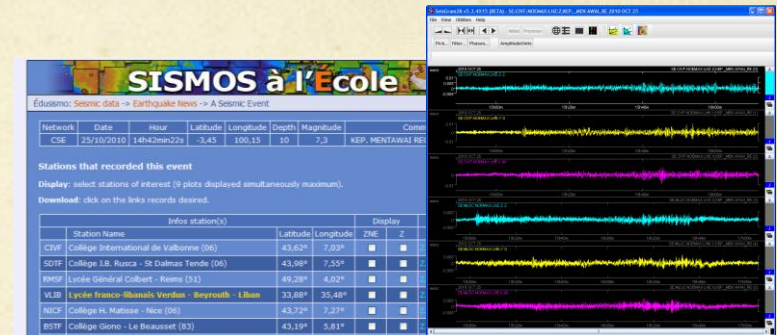
WP8 - Networking School Seismology programs

High school students working with real seismic data from recent earthquakes, data they might have recorded in their own school.

Partners: UK, Switzerland, France, Italy

Objectives

- Event data transfer between projects
- Link European school data with US and world
- Develop web oriented software analysis tools
- Link with Scientific data community
- Share best practices
- Promote school seismology widely



Conclusions

- Networking the different experiences on “seismology at school” across Europe
- Data sharing and easy access to seismology data banks
- Involvements of teachers and students in scientific/didactic projects using new educational tools

Credits

To cite this paper :

Aldo Zollo, Jean-Luc Berenguer, Antonella Bobbio, Francoise Courboulex, Paul Denton, Stefano Solarino, and Anne Sauron, The European experience of educational seismology, Geophysical Research Abstracts Vol. 13, EGU2011-5820, 2011 EGU General Assembly 2011