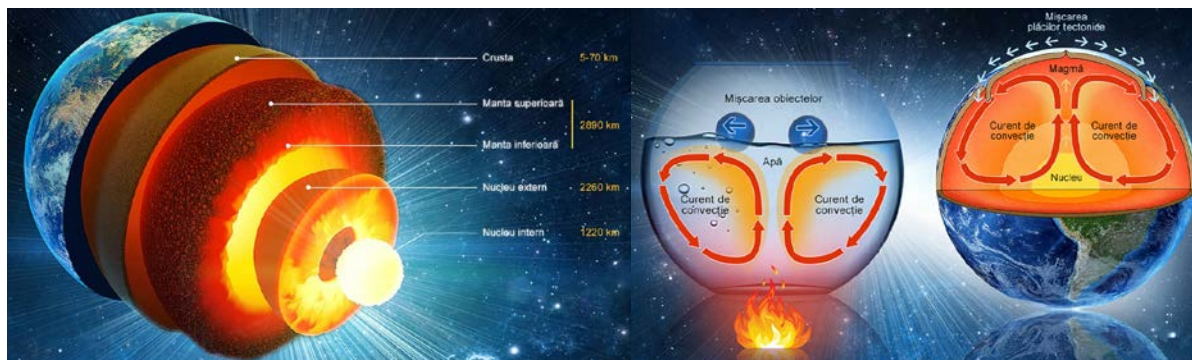


## Educational package

<b>Title</b>	<b>Sharing data - chasing earthquakes</b>
<b>Students' age</b>	11-14 y old / 15-18 y old
<b>Level of education or type of school</b>	Secondary / Highschool
<b>School subject</b>	Physics, Geography, Geology, Informatics

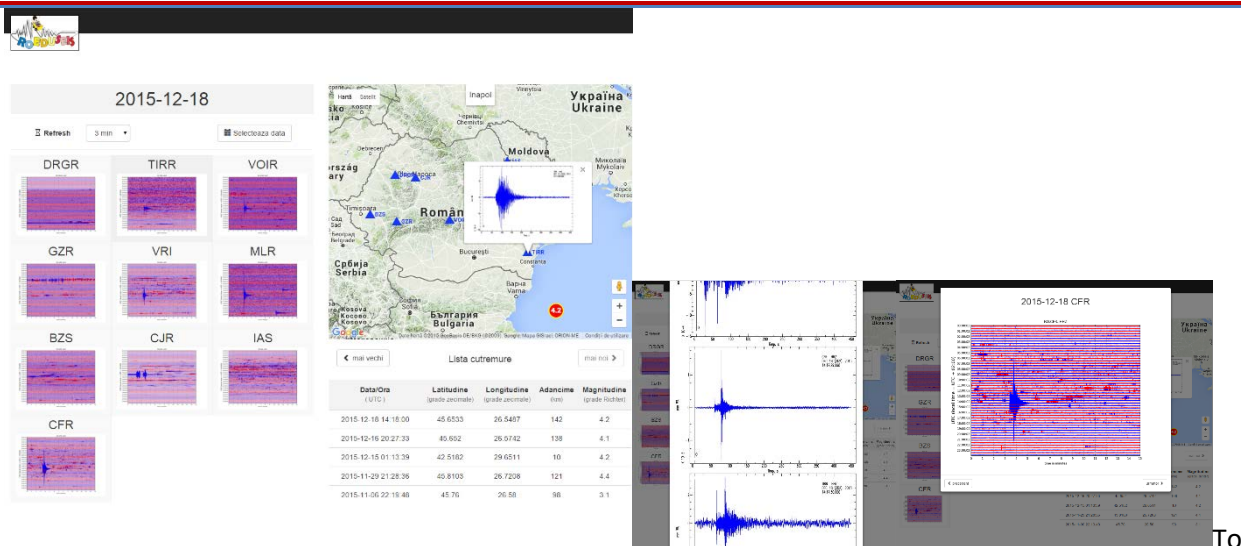
### Short description of content

Earthquakes have always fascinated children. The proposed package will make use of the interest that earthquakes and seismology raise among children at all ages to teach a range of basic science concepts. More than that, using real-Time data on the Internet instead of static information out of a textbook bring another dimension to developed activity, engaging students and project their work to the real world. By real-time data on the Internet we understand information that is updated on a regular basis and frequently changes.



### How students and teachers access the data.

Even if data are made freely available by professional monitoring institutions, education communities need specific database in relation with pedagogic and didactic aspects: access to the data, illustrate case studies, and select seismograms of interest. That is why a specific tool for accessing Romanian earthquake data has been developed and is freely available. More than that, 15 recording locations are in schools, consisting in educational seismographs sending real time event base data to the centralizing application. It is a great opportunity for children to use not only real data but local data in their activities.



To

analyse data, according to their level of study (lower or upper secondary school), students have to understand records, to pick waves time arrival, to estimate amplitude, i.e. they must have a good understanding of seismometry.

### Specific softwares to use the data

Education world needs tools to use data : to pick waves, to locate epicenter, to evaluate amplitude. Thus, there were designed specific softwares as SeisGram2K (A.Lomax), Educarte (A.Lomax, J.L Berenguer), Amaseis (A.Jones), Jamaseis (T. Bravo), freely available and possible to used (and even translated) in schools. Some others are under development in the framework of educational seismology projects and will be also open and dedicated to educational purposes.

## Concept and learning outcomes

### Students know:

- About the Earth, our active planet: earthquakes, crust rupture, faults, waves propagation
- Volcanoes, Mountains, Plate tectonic
- Natural Hazards, mitigation

### Students understand:

- What ancient civilizations believed to be the causes of earthquakes
- How to discover the internal structure and dynamic of the Earth by using seismology as a tool
- How complex seismic waves propagate through the Earth
- How to measure the size of an earthquake (magnitude and intensity scales)
- Concepts as: tectonic plate, plate boundaries, faults, plate interaction

### Students are able to:

- learn about different type of seismic wave phases and learn how to identify
- use seismic phase time to locate events and map it
- understand and realize the internal structure of the earth
- understand how seismic wave travel through Earth

- download and visualize and manipulate seismic data
- make the difference between different earthquake (big/small, local/distant, crustal/deep)

### Elements of educational package (created in ERIS)

<b>Multimedia presentation</b>	PPT presentation containing text animations, graphs and videos
<b>Worksheets</b>	Support materials to be used during and/or after theoretical presentation
<b>Evaluation sheet</b>	Short evaluation in the form of quizzes or simple questions
<b>One-page information</b>	One page pdf containing more details about a subject touched during the class and needed to understand better the delivered content

### Additional materials for teachers (websites links, science articles, etc.)

<a href="http://www.roeduseis.ro/category/resurse-educationale/">http://www.roeduseis.ro/category/resurse-educationale/</a> (in Romanian)	Web page that contains categorized teaching materials, based on type and content (theoretical notions, work plan, practical activities)
<a href="http://mobee.info/despre-cutremure/aplicatii">http://mobee.info/despre-cutremure/aplicatii</a> (in Romanian)	Interactive apps that can be downloaded and run on any computer.
app.roeduseis.ro	Interactive application used to access, view, download and basic process seismic waveform.

### Online lesson

<b>Subject</b>	Earthquakes and their effects
<b>Duration</b>	50 min
<b>Materials/Preparation</b>	
Computer, Projector (Preferred Interactive table)	

Applications installed on computers

Printed worksheet (optional)

Printed evaluation sheet (optional)

### Lesson flow

Typical mode for conducting a lesson will involve viewing the multimedia presentation (theoretical concepts presented in a blend of text-video-graph content) with at least 2 points of interaction in the form of short hands-on-activities (10 min each). In the end a evaluation form will be used to observe how important notions presented have been/or not understood by the students.

### Homework

Many of the topics presented involve a multitude of possible associated activities. The most important and tested ones will be mentioned as possible follow-up activities. They may have either in the form of experiments and/or worksheets. It will be up to teacher to recommend the most suitable ones with regard to class(lesson) focus.

<http://www.roeduseis.ro/category/resurse-educationale/activitati-practice/> (in Romanian)