
Recording and Studying earthQUAKES in the school

Maria Eleftheriou

Science teacher , Scientix Ambassador



- 1. Record**
- 2. Study and visualization
of data**
- 3. Educational Scenarios**



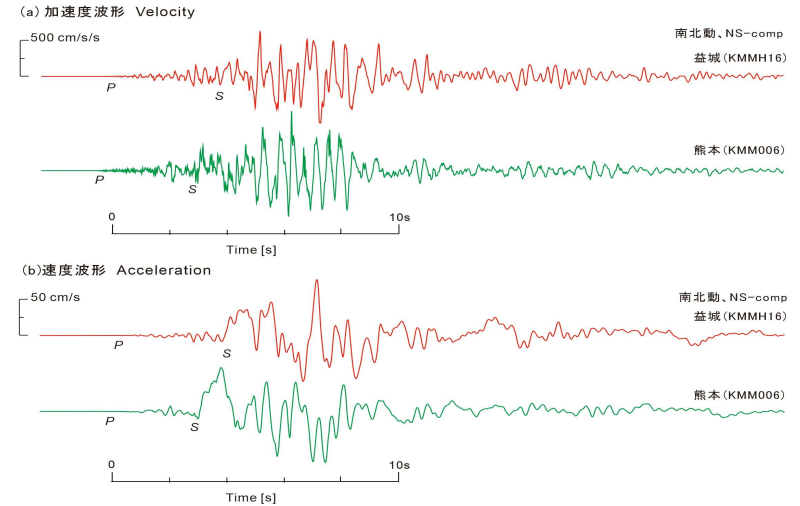
→ **1. Recording earthquakes**

a) quake-catcher network

b) Applications of mobile Phones

Seismical waves

- Longitudinal P waves (first coming)
- Transverse S waves. (stronger)
- Surface waves R, L waves (at the end)





Quake-Catcher-Network

After almost 8 years in Stanford, one year to CalTech the project now is moved to the University of Southern California Dept. Earth Sciences.

<http://quakecatcher.net/>

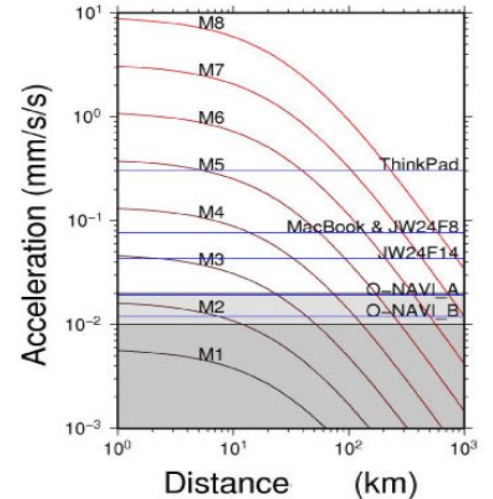
Qcn sensors can be borrowed in US (for free).

MEMS type

example of school: [Lyceum of Tzermiadon](#), Crete, Greece



Sensor Noise



Qcn map generated on 4/9/17



Boinc

<https://boinc.berkeley.edu/>

Choosing BOINC projects

 Search

BOINC is used by many volunteer computing projects. Some are based at universities and research labs, others are run by companies and individuals. You can participate in any number of these projects.

In deciding whether to participate in a project, read its web site and consider the following questions:

- Does the project clearly describe its goals? Are these goals important and beneficial?
- Has the project published results in peer-reviewed journals or conferences? See [A list of scientific publications of BOINC projects](#).
- Do you trust the project to use proper security practices?
- Who owns the results of the computation? Will they be freely available? Will they belong to a company?

The following projects are known to us at BOINC, and we believe that their descriptions are accurate.

Projects have different requirements such as memory size; a partial summary is [here](#).

If your computer is equipped with a Graphics Processing Unit (GPU), you may be able to [use it to compute faster](#).

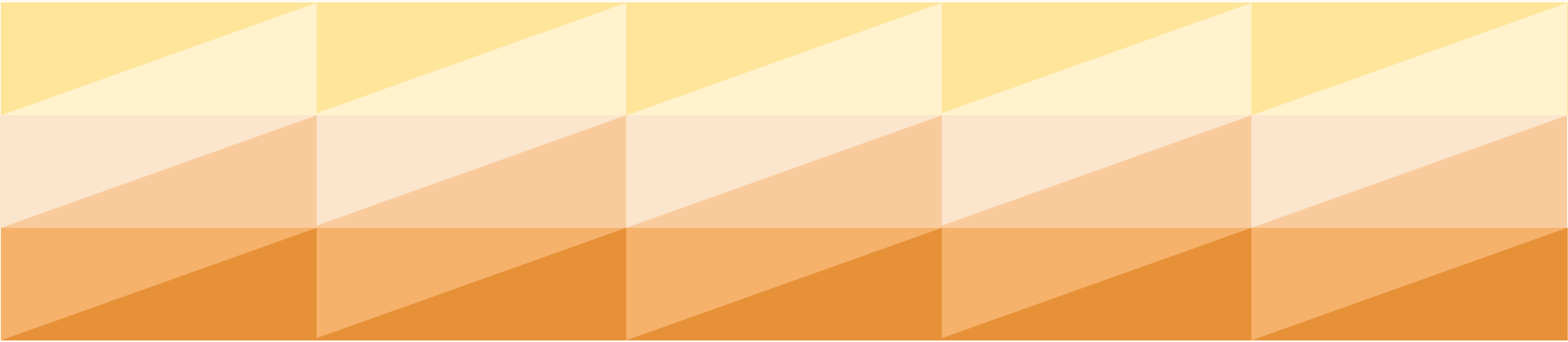
Name <small>Mouse over for details; click to visit web site</small>	Category	Area	Sponsor	Supported platforms
Asteroids@home	Physical Science	Astrophysics	Charles University in Prague	       Details
ATLAS@Home	Physical Science	Physics	CERN (European Organization for Nuclear Research)	    Details
CAS@home	Multiple applications	Physics, biochemistry, and others	Chinese Academy of Sciences	 



QCN live

quakecatcher.net/education/qcn-interactive

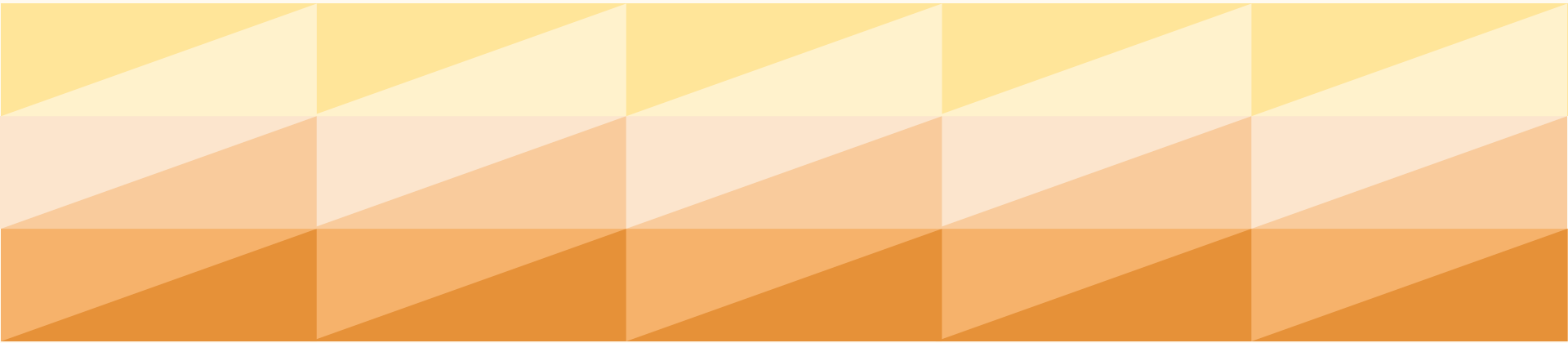
**Android + seismometer
ios + wakeup!,
iseismometer etc.**



www.airdroid.com (pc & smartphone)

screenshot

**we see what happens in our smartphone in
the screen of our pc in realtime.**



Visualization and study data

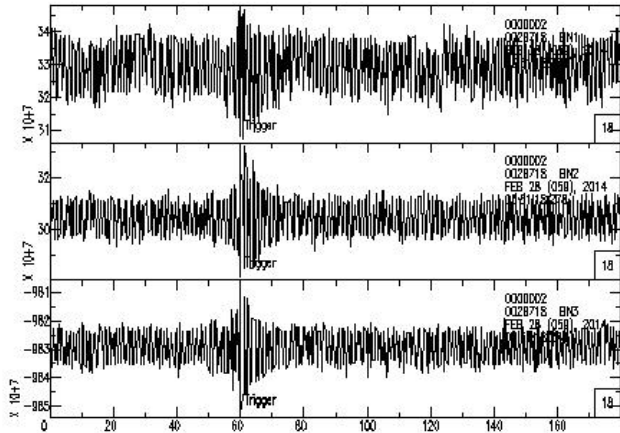
[Sac](#) (Incorporated Research Institutions for Seismology)

[jAmaSeis](#) (IRIS)

[IRIS Wilber3 data portal](#) (IRIS)

[IRIS Earthquakebrowser](#) (IRIS)

[SeisGram2K](#) (ALomax Scientific)



SAC: Seismic Analysis Code: Data from qcn are in .sac form. Download a program from [IRIS](#) and then run in a terminal the [sac program](#). (linux)

jAmaSeis: <https://www.iris.edu/hq/jamaseis/>

Is written in Java and runs on any computer, even a [Raspberry Pi](#).

- obtain and display seismic data in real-time from either a local instrument or from remote stations
- filter data
- estimate event magnitudes
- generate images showing seismograms and corresponding calculations

**19/9/17 13:26 UTC , Southern Iran 5.1 R
(Seismic Station: University of Sharjah, UAE)**

**3/9/17 03:30 UTC, North Korea ? 6.3R
(Seismic Station: Incheon, Rep. Korea)**

8/9/17 04:49 UTC, Mexico 8.1 R

**19/9/17 18:14 UTC Mexico 7.1R
(Seismic Station: Tegucigalpa, Honduras)**

[-4 Hr] [-1 Hr]

MC source: AT_S

Sun Se

3:00

0:00

1:00

2:00

3:00

4:00

5:00

6:00

st Value: 1108

MC source: IU_A

Sun Se

3:00

0:00

1:00

2:00

3:00

4:00

5:00

6:00

st Value: -305

MC source: IU_I

Sun Se

3:00

0:00

1:00

2:00

3:00

4:00

5:00

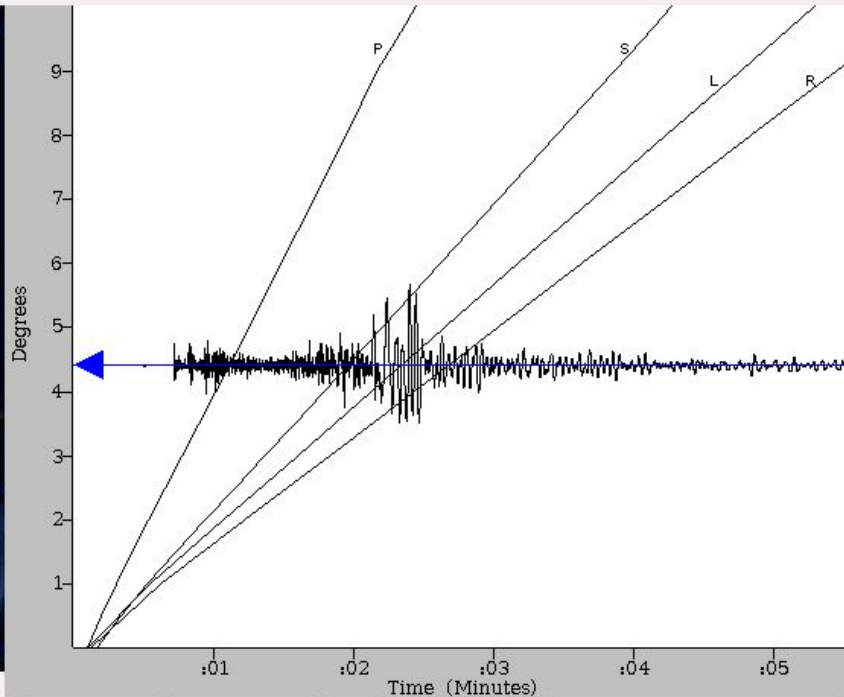
6:00

st Value: -400



Lat 46.9312°

Lon 121.3160°



Station...	Station Name	Location	Lat/Lon	Distance	Magnitude	Filt...	Start Time	Device Type
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INCN	IU_INCN_00_B...	Inchon, Republ...	(37.478, 126.6...	4.43°491.65 ...	Not Compu...	None	09/03/2017 0...	Streckeisen STS-1VBB w/...
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Station Actions

Change Station Information

Compute Distance

Compute Magnitude

Set Filter

Edit Selection

Remove Station

View Save .sac File

:55

Scale

:55

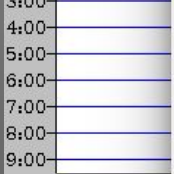
Scale

:55

3 Hr -4 Hr -1 Hr

MC source: AT_S

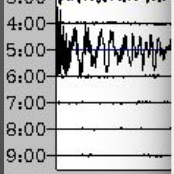
Sat Se



ast Value: 1066

MC source: II JT

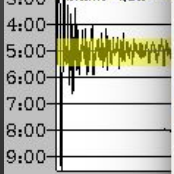
Sat Se



ast Value: -4428

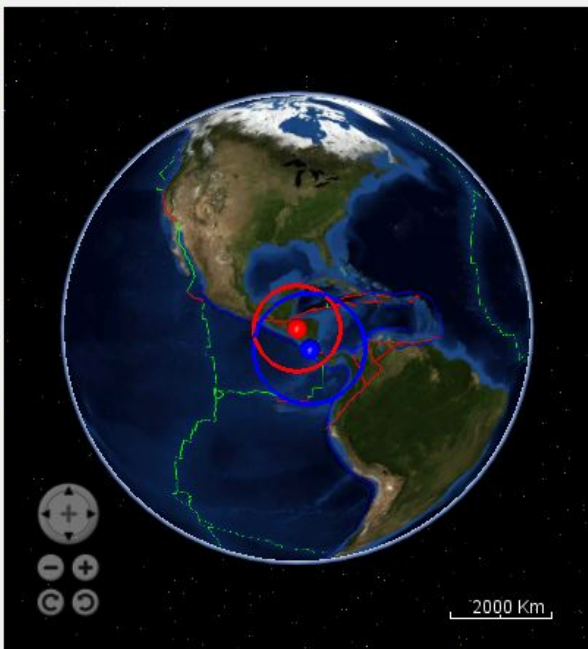
MC source: CU

Sat Se

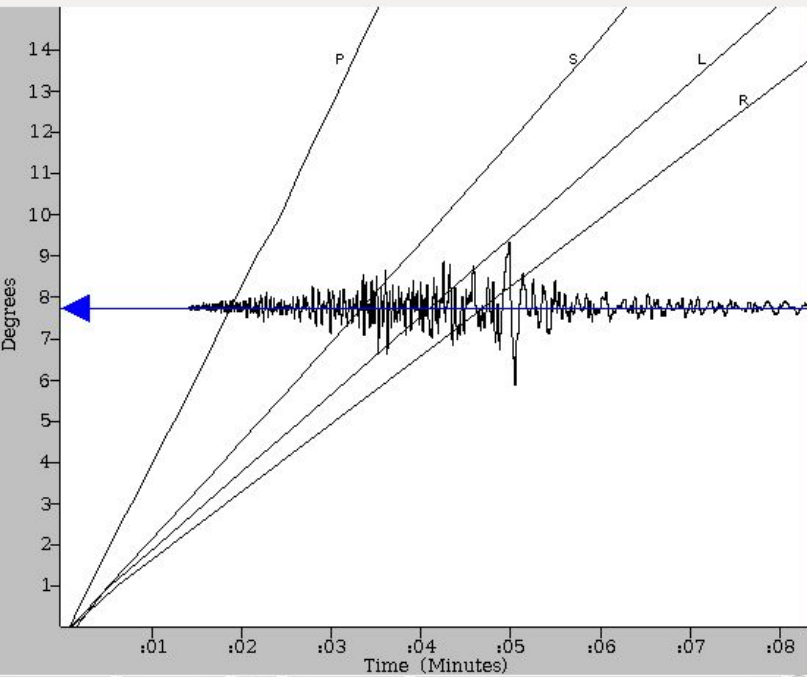


ast Value: 1367

Time at mouse loc



Off-Globe



Stati...	Station ...	Location	Lat/Lon	Distance	Magnitu...	Fil...	Start Time	Device Type
JTS	II_JTS_0...	Las Juntas de Abangare...	(10.291, -...	10.10°1122...	Not Com...	No...	09/09/201...	Streckeisen STS-1 Seismometer wi...
TGUH	CU_TGU...	Tegucigalpa, Honduras	(14.057, -...	7.75°860.6...	Not Com...	No...	09/09/201...	Streckeisen STS-2 Standard-gain

Station Actions

- Change Station Information
- Compute Distance
- Compute Magnitude
- Set Filter
- Edit Selection
- Remove Station

- Add Station
- Go To Stream View

- Create Report
- FFT
- Help

View Save .sac File IRIS

:55 Scale Data

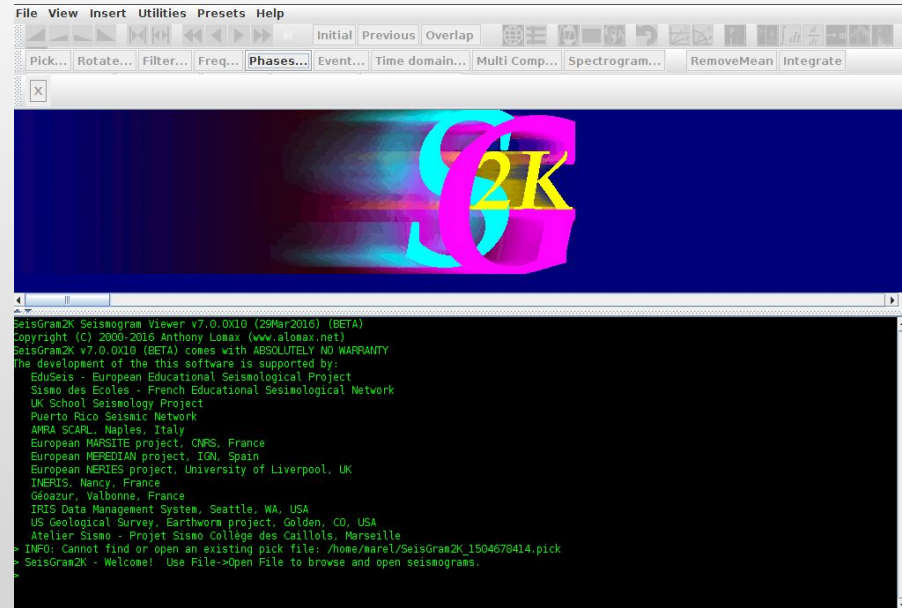
:55 Scale Data

:55 Scale Data

:55 Scale Data

20:24:10

The SeisGram2K Seismogram Viewer is a Java program for interactive viewing of earthquake seismogram traces locally or over the Internet.



IRIS: Wilber3 portal

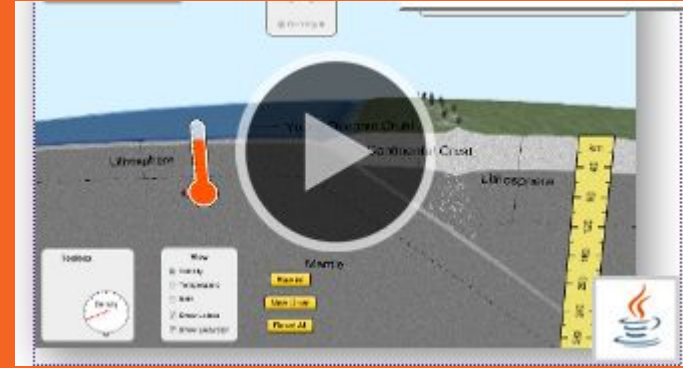
Wilber initially displays all events for the past month, or magnitude 4.0R and larger events for the last 12 months, and many more...

The screenshot shows the 'Wilber 3: Select Event' web interface. At the top, there is a navigation bar with 'Data Services' and 'Wilber 3'. A 'Wilber Support' button is in the top right. Below the title, a light blue banner contains the text 'Looking for previously requested data? View recent requests.' The main content area features a world map on the left with a 'Draw Selection Box' tool. To the right of the map are several filters: a dropdown menu set to 'Past 30 days, all magnitudes', a date range selector showing '2017-08-01' to '2017-09-01', a magnitude range selector showing '0' to '10', and a location selector with a grid of boxes labeled 'N', 'S', 'E', and 'W'. At the bottom of the map area, it says 'Maximum: 2000 events mapped. Some events sorted lower in the list are not mapped.' and includes a 'Legend' dropdown. At the very bottom of the page, it indicates '9710 events listed' and a 'Download events' button.

Educational scenarios

Phet simulations (plate tectonics)

<https://phet.colorado.edu/en/simulation/legacy/plate-tectonics>



Quake Catcher Network explorer:

<http://quakecatcher.net/qcn-explorer>



Thank you for your attention!