

Romanian Seismic Network

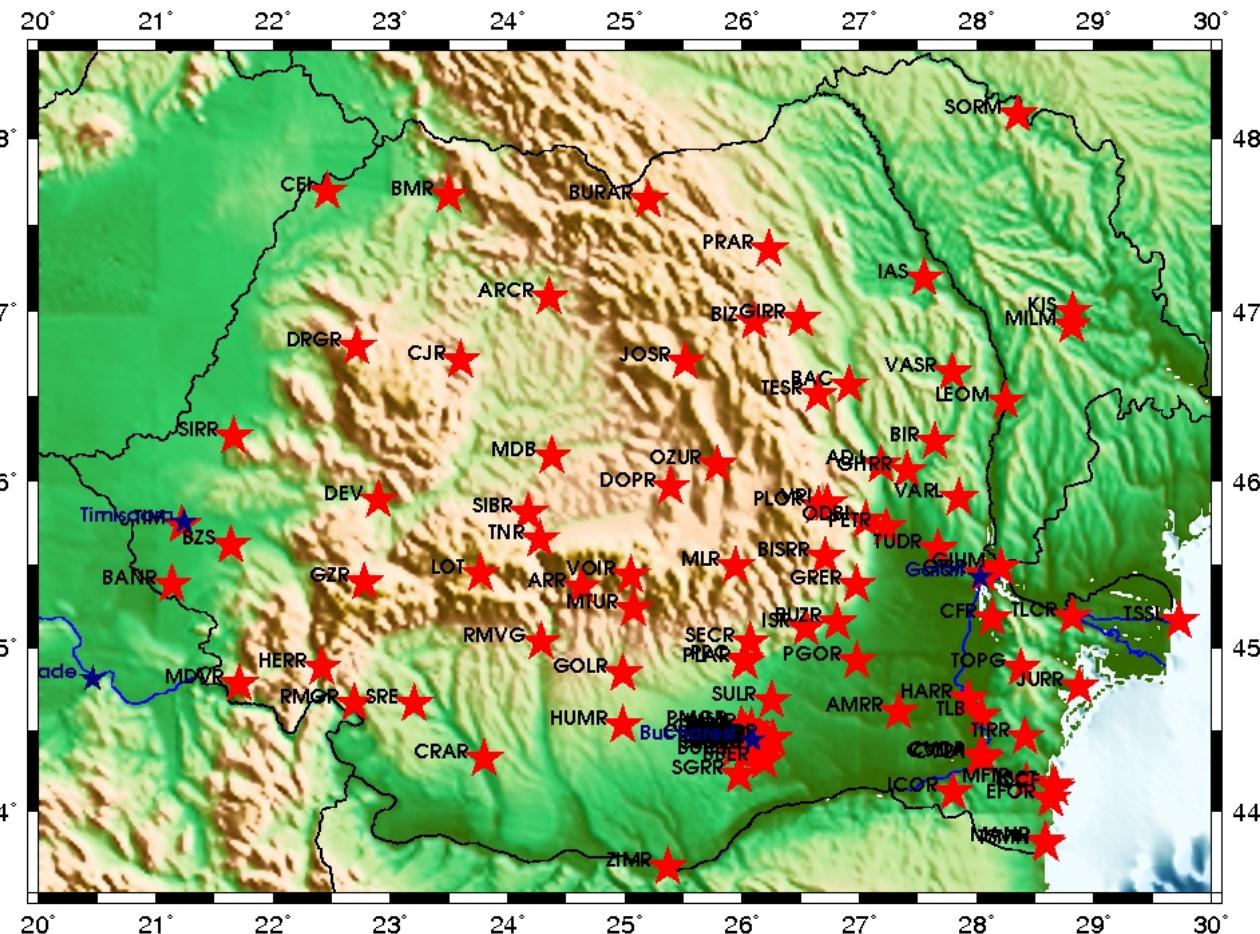
Geophysical Institute
University of Bucharest

Seismological Observatory
Bucharest, Romania

Romanian Seismic Network

- The main seismic survey of Romania is performed by the National Institute for Earth Physics (NIEP).
- The National Institute for Earth Physics operates a real-time digital seismic network.
- The network has digital seismic stations equipped with different high quality digitizers (Kinematics K2, Quanterra Q330, Quanterra Q330HR, PS6-26, Basalt), broadband and short period seismometers (CMG3ESP, CMG40T, KS2000, KS54000, KS2000, CMG3T, STS2, SH-1, S13, Mark I4c, Ranger, gs21, Mark I22) and acceleration sensors Episensor Kinematics.

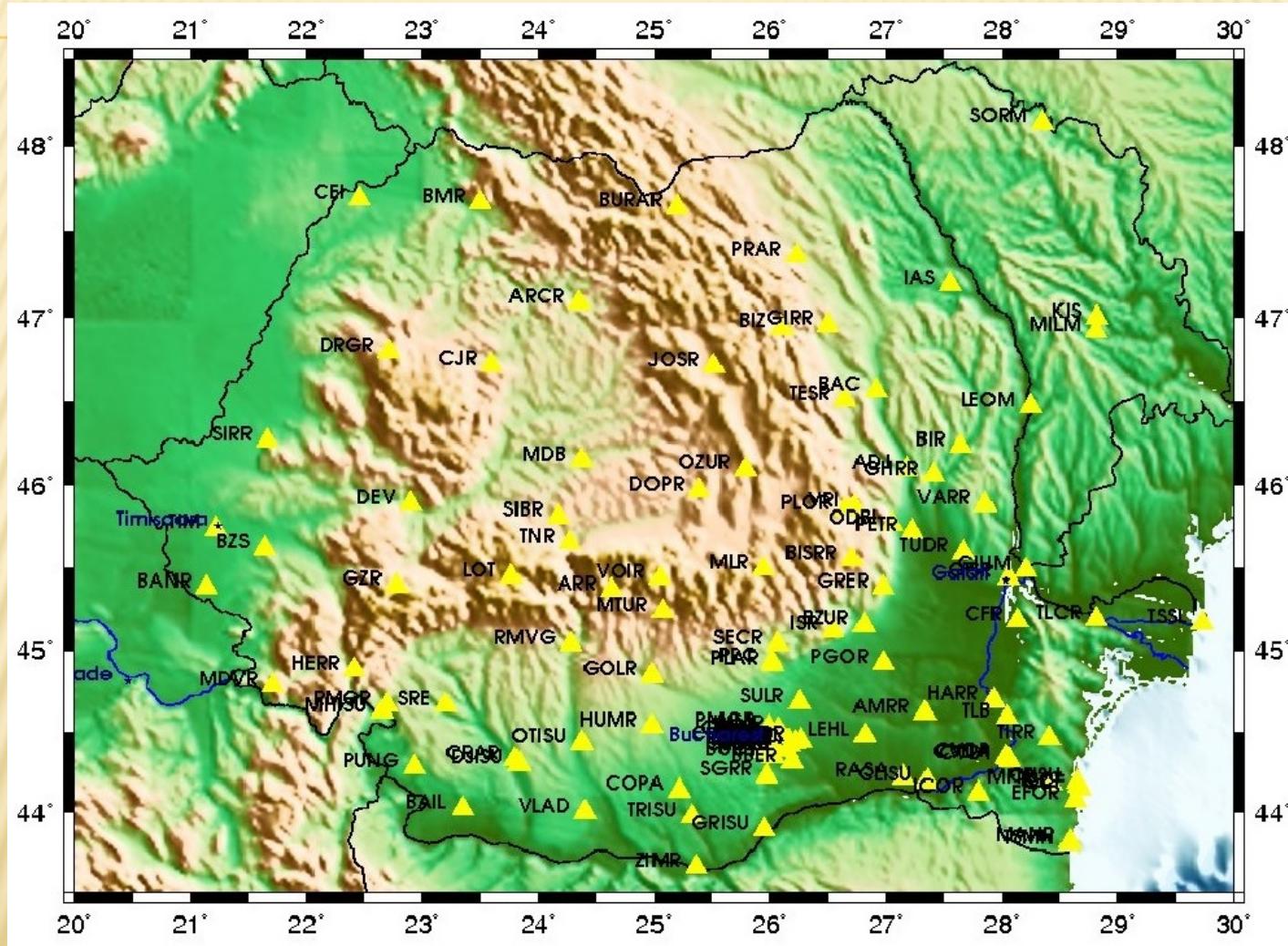
Romanian Seismic Network



- The NIEP real-time network currently consists of 102 stations and two seismic arrays.

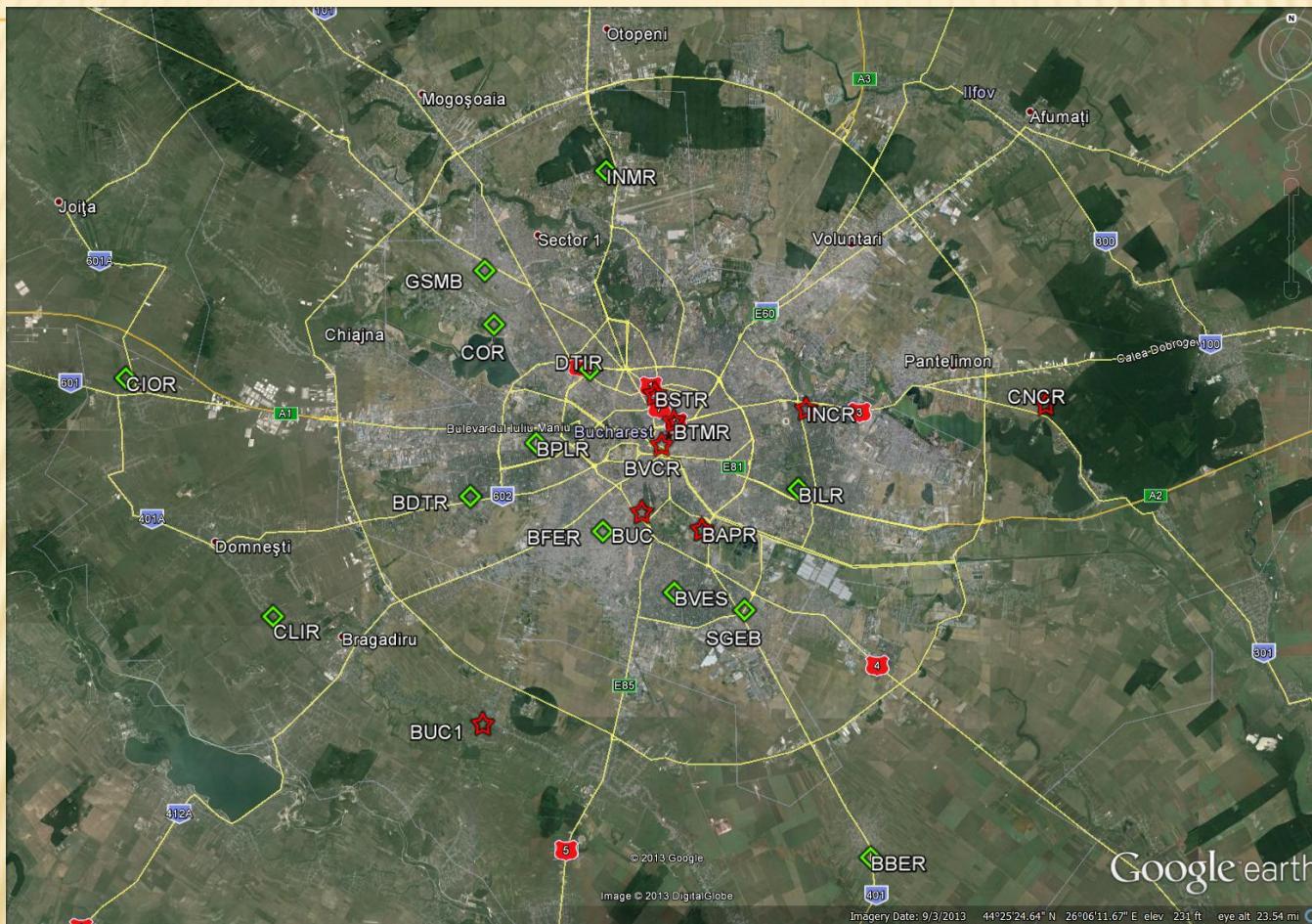
Real time Seismic Network

Strong Motion Stations



119 strong motion stations using – accelerometers (EpiSensor)

Romanian Seismic Network



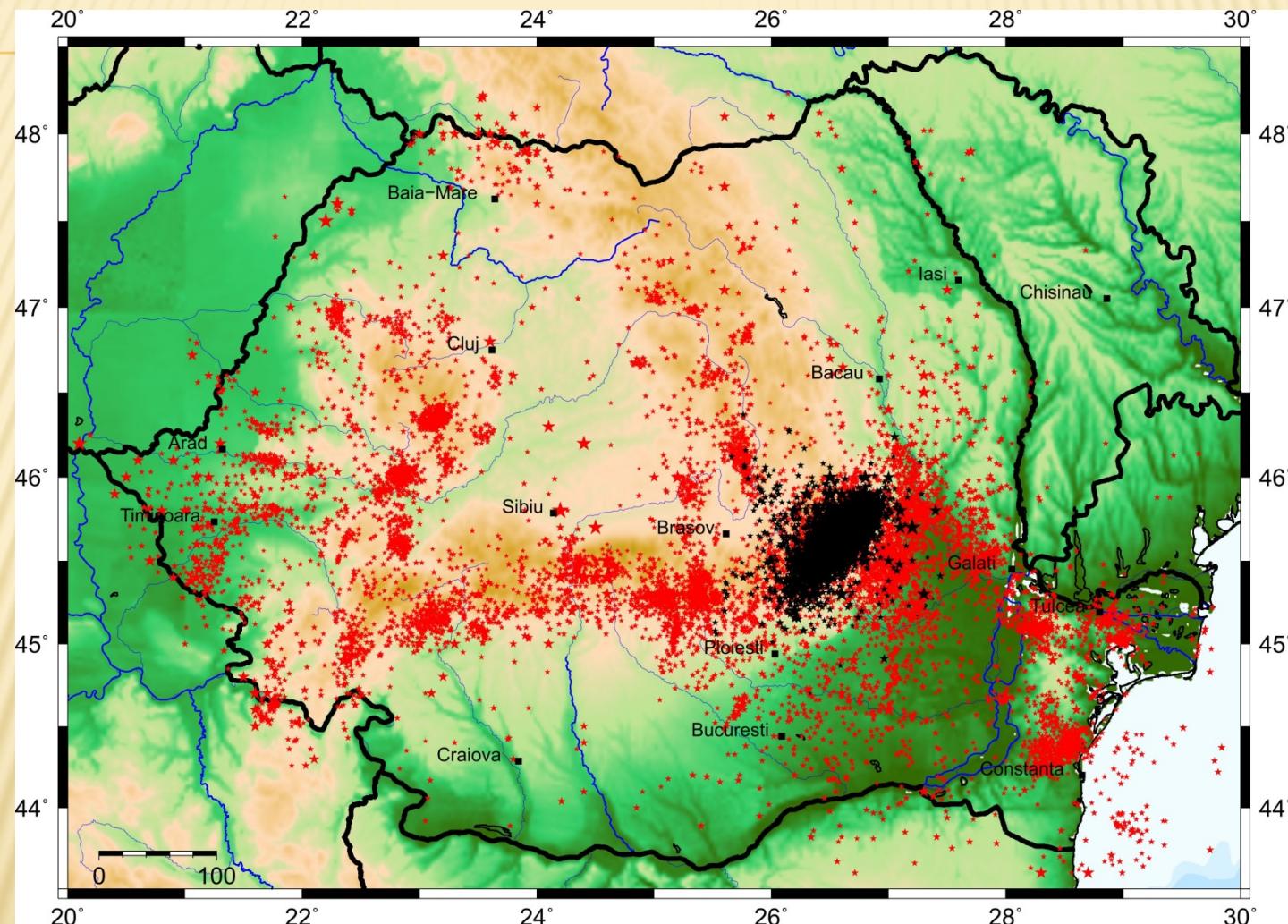
NIEP operates in Bucharest 23 stations: eight of them are in real time (red stars)

Romanian Seismic Network



- During DACEA project 29 seismic stations were installed

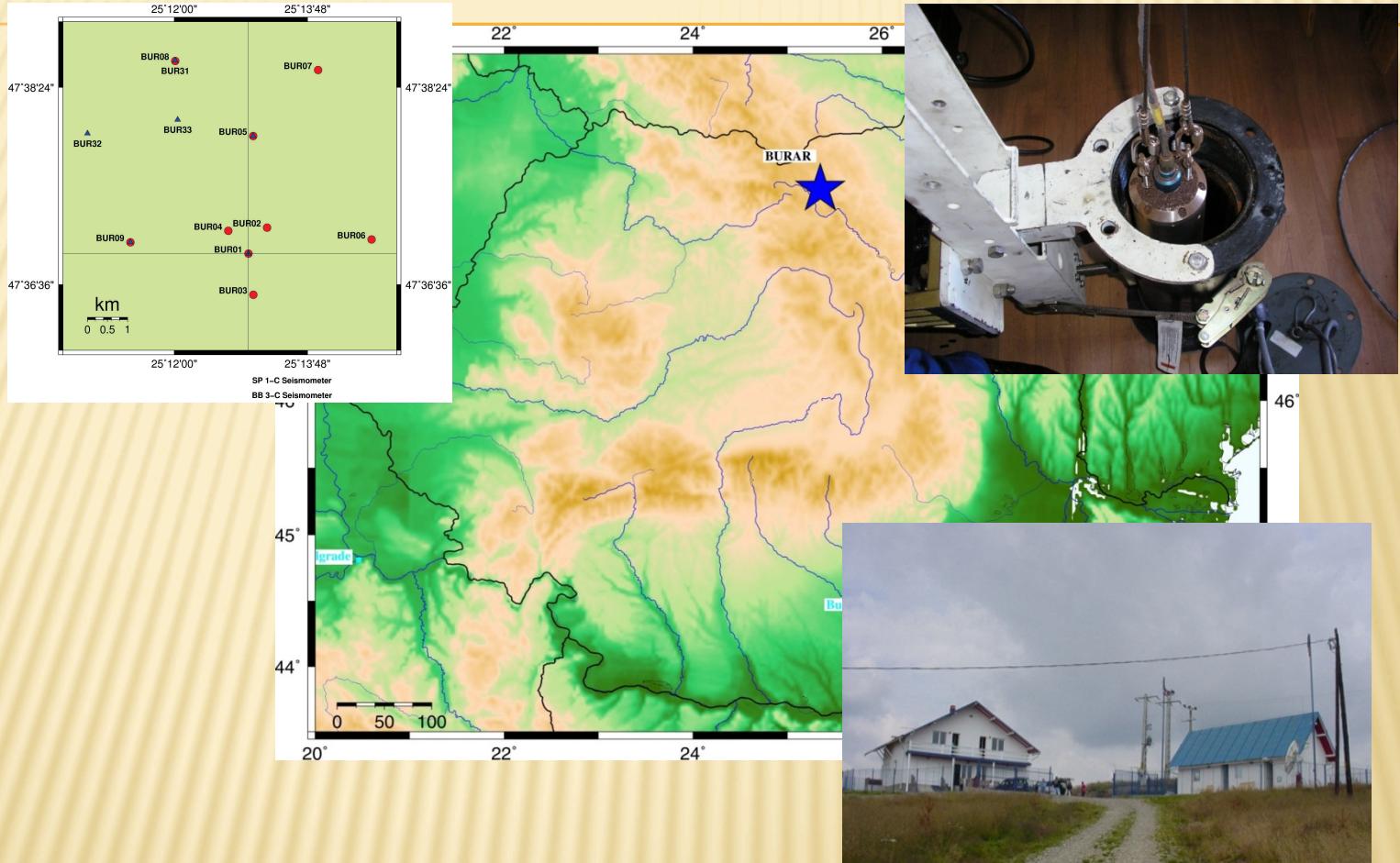
Local Seismicity



04.03.1977, $h = 94$ km, $Mw = 7.4$
30.08.1986, $h = 131$ km, $Mw = 7.1$

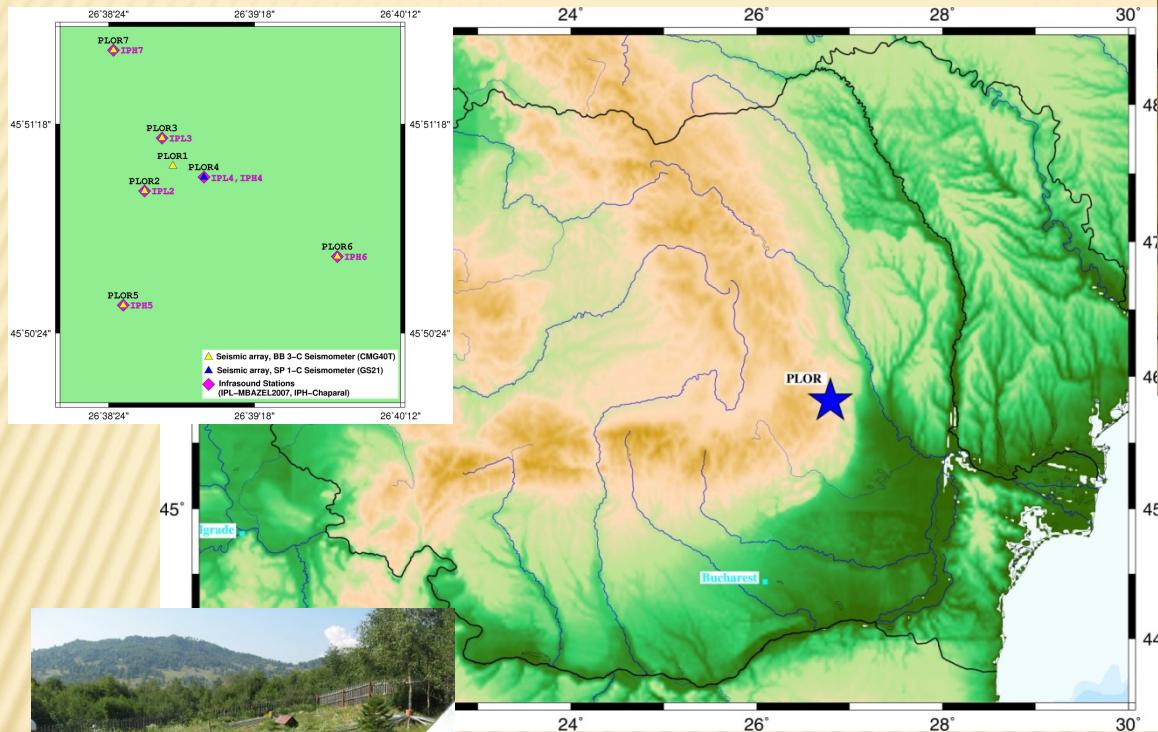
31.05.1990, $h = 86.9$ km, $Mw = 6.4$
27.10.2004, $h = 98.6$ km, $Mw = 6.0$

Bucovina Array



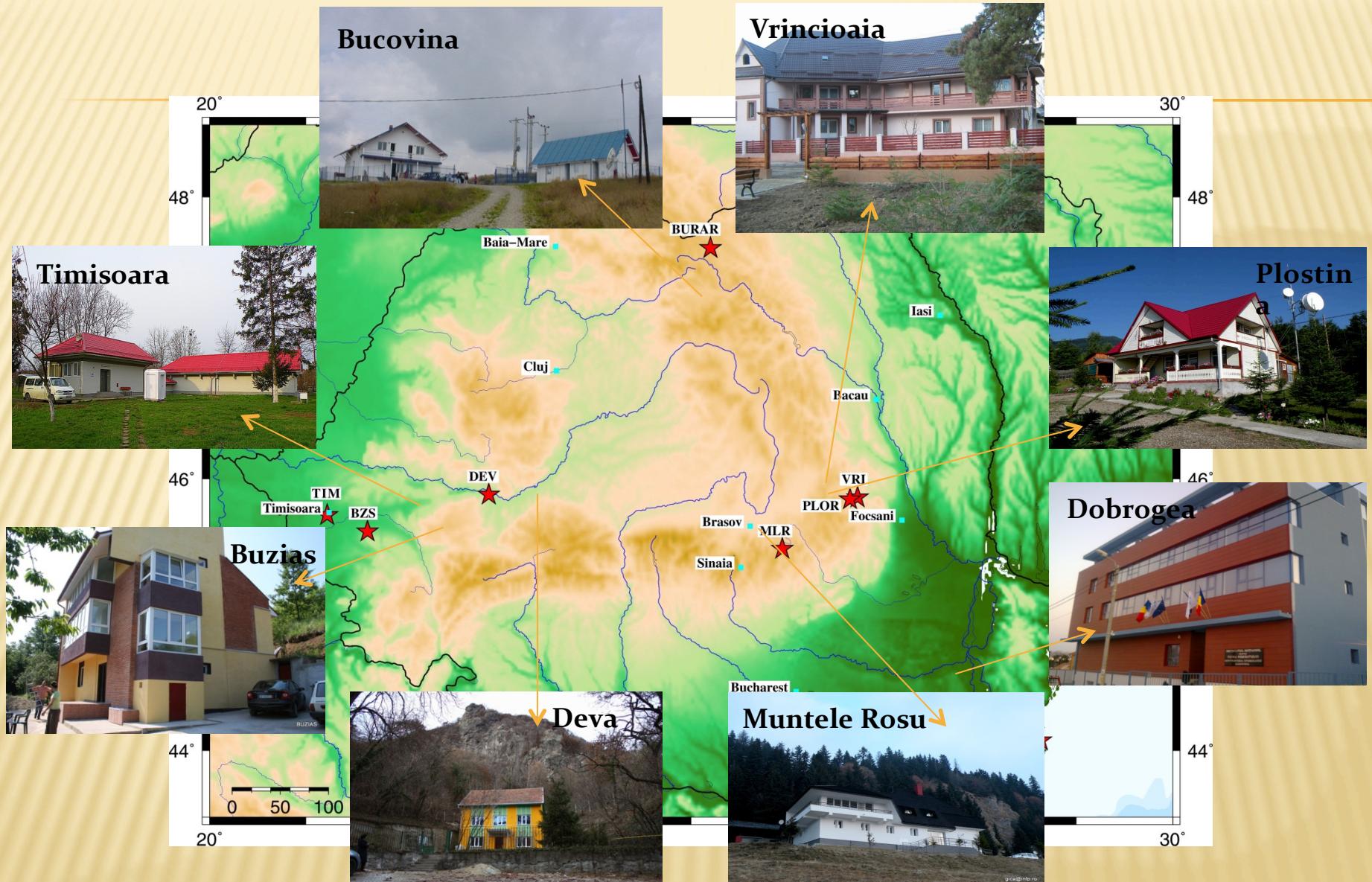
- The array elements are distributed on an area of 25 km square.
- The Burar Array has 6 broad band sensors, 9 short period sensors and one accelerometer.
- The data from this sensors are transmitted in real time to the National Data Center and from here to US.

Plostina Array



- A seismic array of 7 broad band sensors (yellow triangle) distributed on an area of 2 km square
- A short period sensor (blue triangle)
- An infrasound array with 7 elements (purple diamonds)
- A GPS station
- The data from the seismic array and also from the infrasound stations are transmitted in real time to NDC.

Seismological Observatories



Romanian network has 8 observatories all around the country, Dobrogea Observatory is the back-up for the NDC and also a monitoring center for Black Sea tsunami events.

Data Exchange

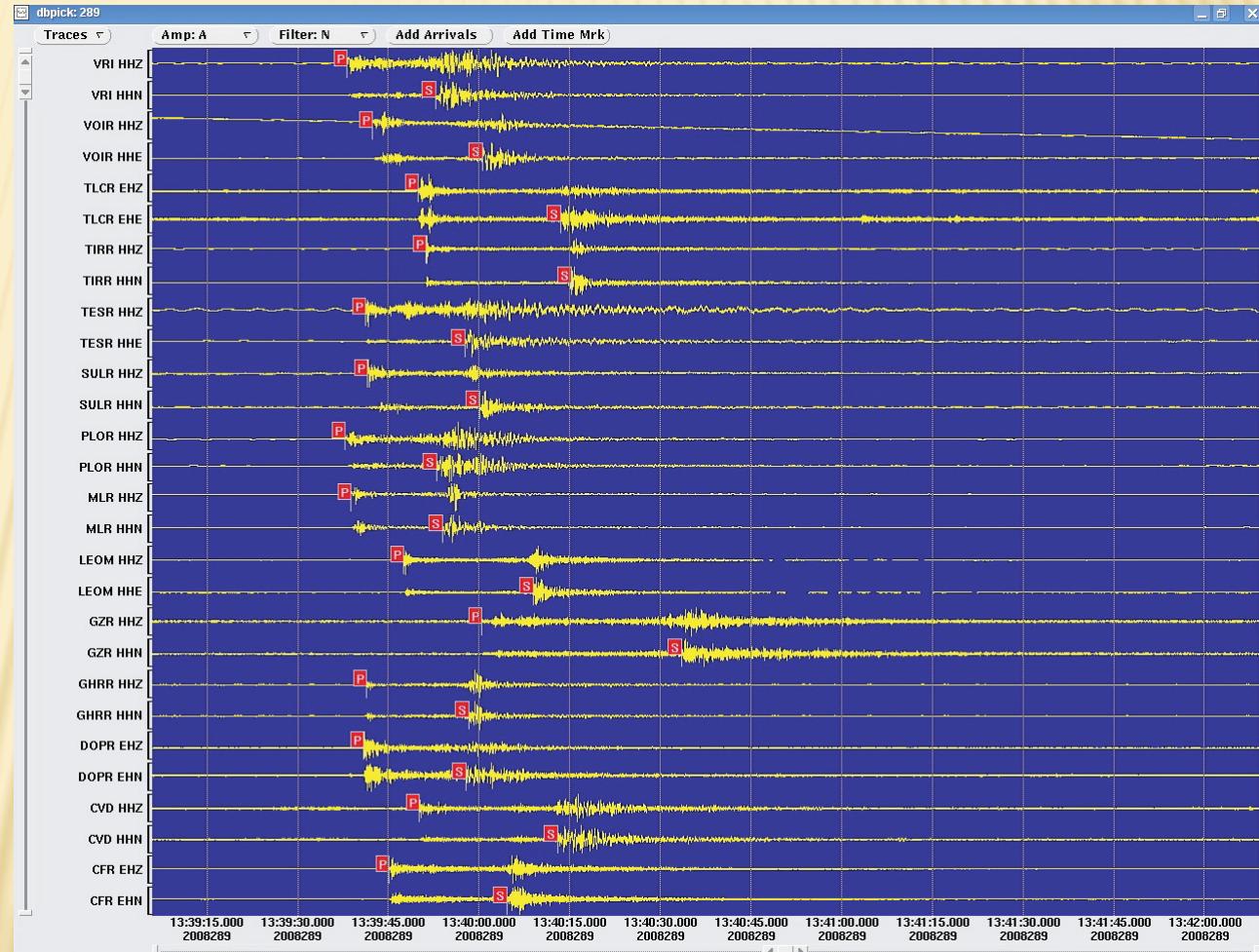


Data recorded by RSN, together with real time seismic data from several European stations (Bulgaria, Czech Republic, Greece, Hungary, Italy, Russia, Turkey, Georgia), are sent to the ROM NDC, in Magurele.

Antelope 5.4

Automatic processing:

- P-wave picking
- event association
- event localization
- computation of magnitude
- sending e-mail / SMS alerts



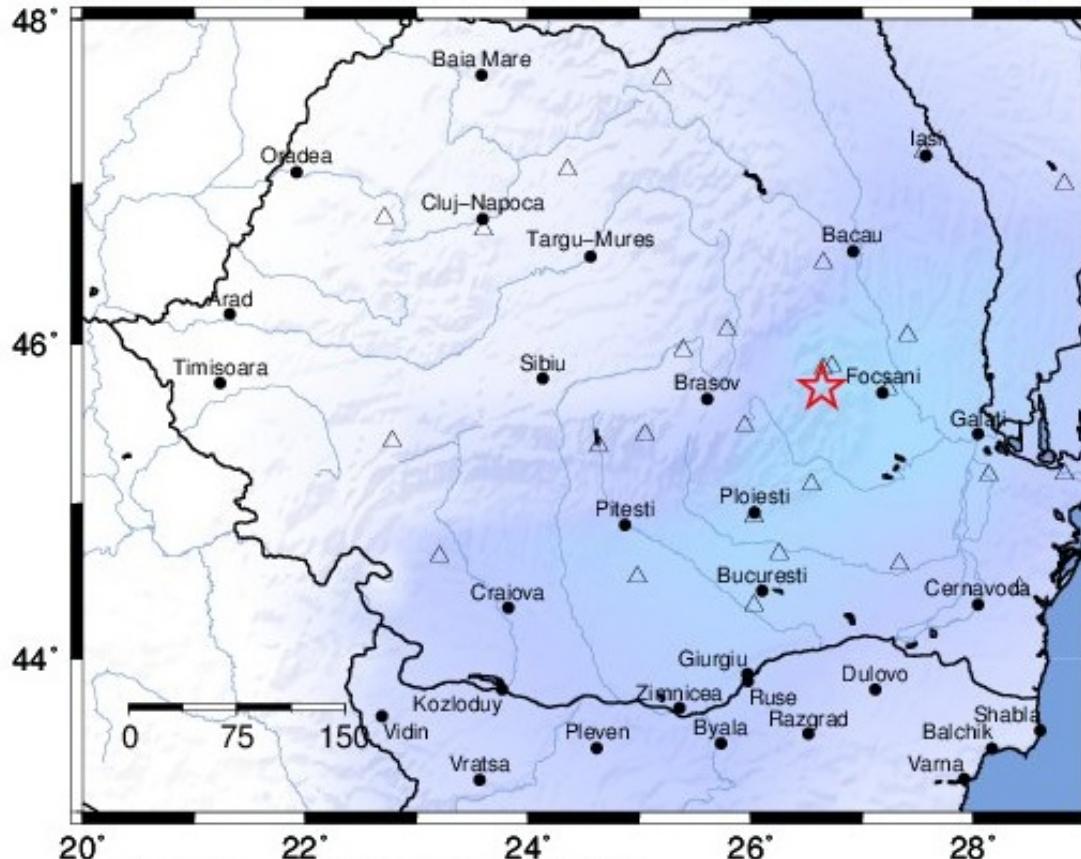
Manual processing:

- phase picking
- event association
- computation of magnitude
- creation of database
- sending reports/ bulletins

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NIEP ShakeMap : ROMANIA

Sat Feb 21, 2015 19:10:12 GMT M 4.2 N45.73 E26.64 Depth: 143.7km ID:21191012



Map Version 3 Processed Sat Feb 21, 2015 09:54:39 PM USR

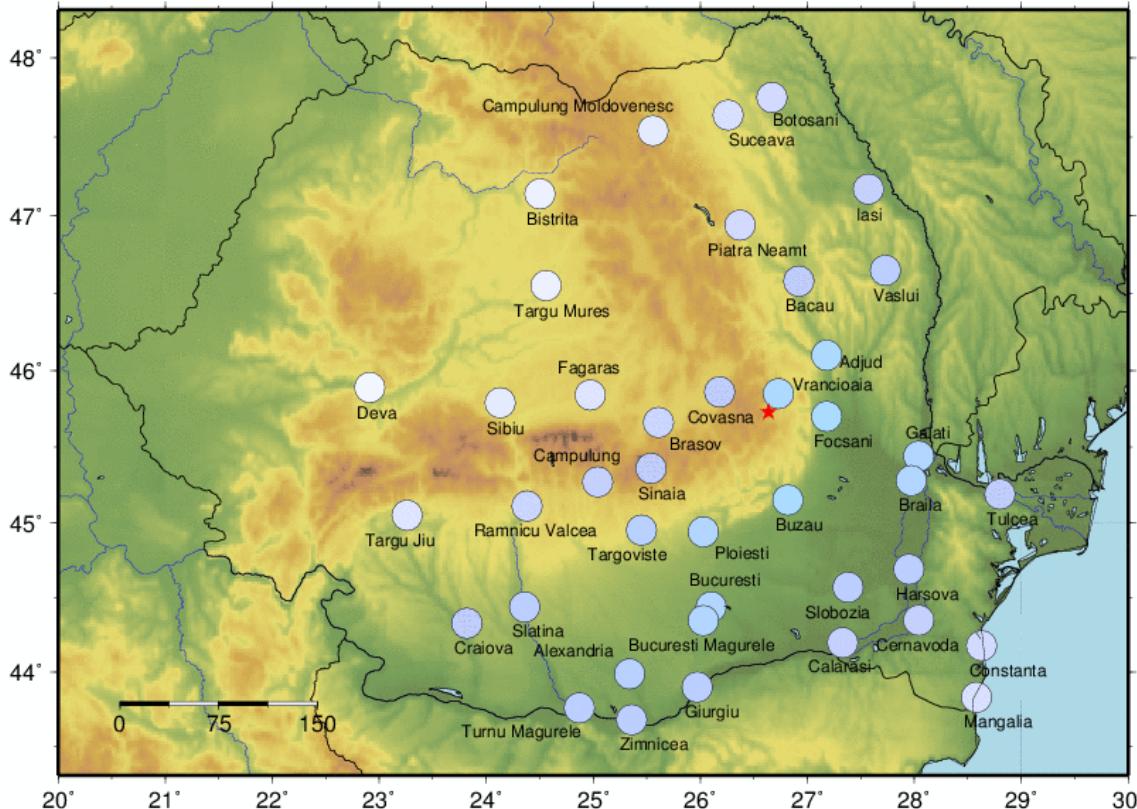
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

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Estimated intensities based on IPE::VS04_msk attenuation law

Epicentral intensity: II-III

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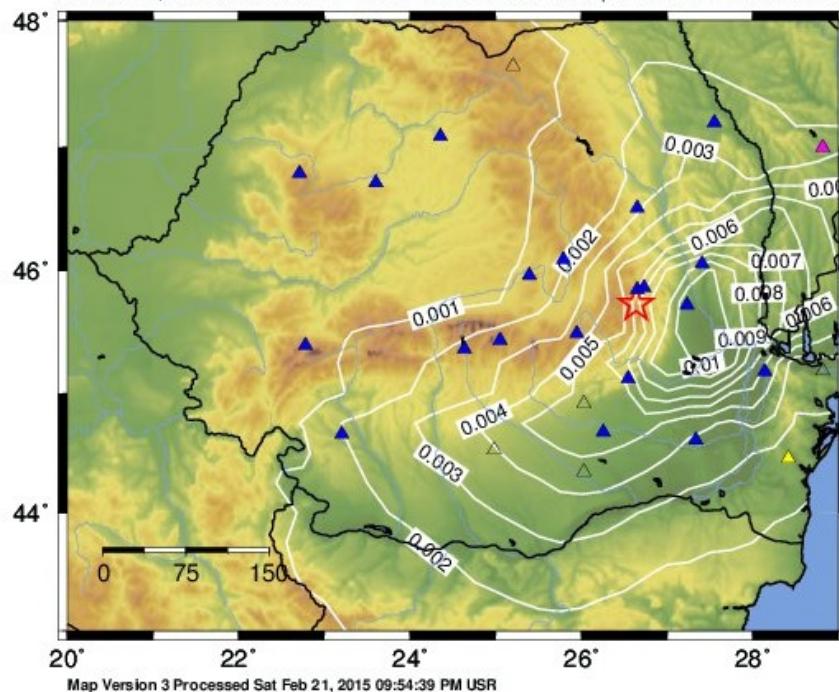
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

City	Distance(km)	Intensity
Vranceaia	15	II-III
Covasna	38	II
Focsani	42	II-III
Adjud	58	II-III
Buzau	66	II-III
Brasov	80	II
Sinaia	95	II
Bacau	96	II
Ploiesti	99	II-III
Galati	114	II-III
Braila	115	II-III
Targoviste	127	II
Fagaras	130	I-II
Vaslui	132	II
C-lung	134	II
Piatra Neamt	136	I-II
Slobozia	141	II
Bucuresti	149	II-III
Harsova	154	II
Bucuresti Magurele	160	II-III
Iasi	175	II
Calarasi	178	II
Tulcea	179	II
Targu Mures	184	I-II
Cernavoda	189	II
Ramnicu Valcea	189	II
Sibiu	195	I-II
Giurgiu	210	II
Suceava	214	I-II
C-lung Moldovenesc	217	I-II
Alexandria	218	II
Botosani	224	I-II
Bistrita	227	I-II
Slatina	229	II
Constanta	233	I-II
Zimnicea	249	II
Turnu Magurele	259	II
Mangalia	261	I-II
Craiova	271	II
Targu Jiu	275	I-II
Deva	290	I

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NIEP Peak Accel. Map (in %g) : ROMANIA

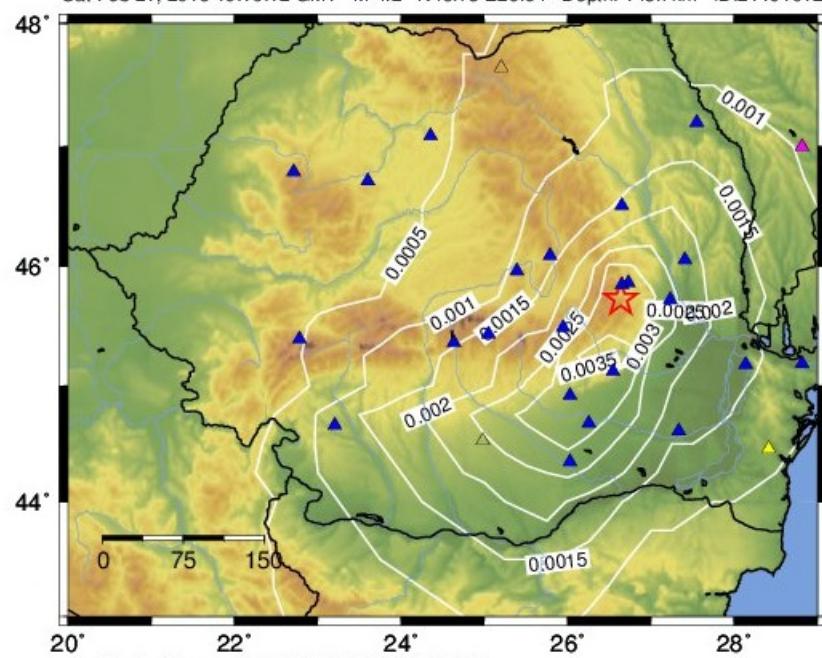
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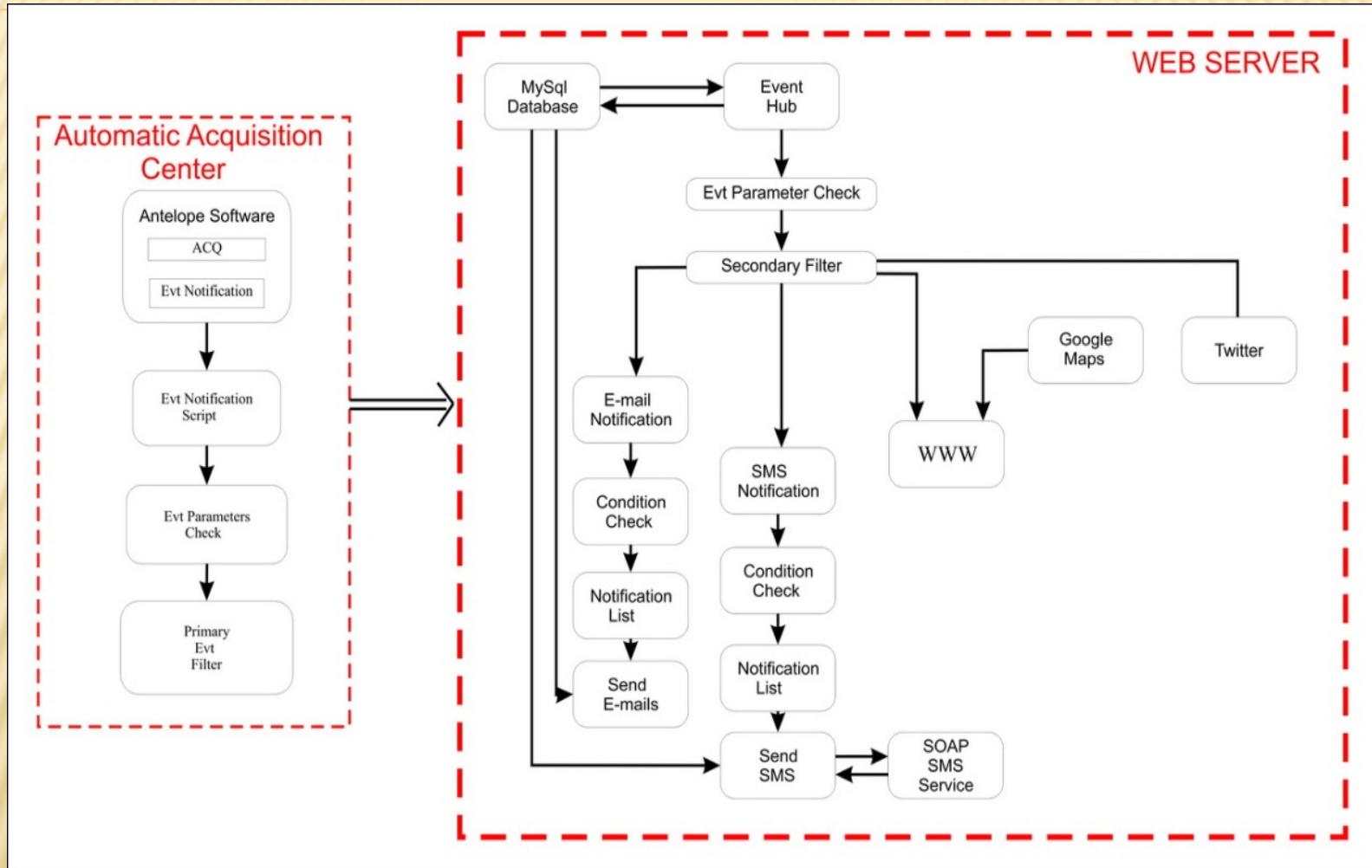
NIEP Peak Velocity Map (in cm/s) : ROMANIA

Sat Feb 21, 2015 19:10:12 GMT M 4.2 N45.73 E26.64 Depth: 143.7km ID:21191012



Map Version 3 Processed Sat Feb 21, 2015 09:54:39 PM USR

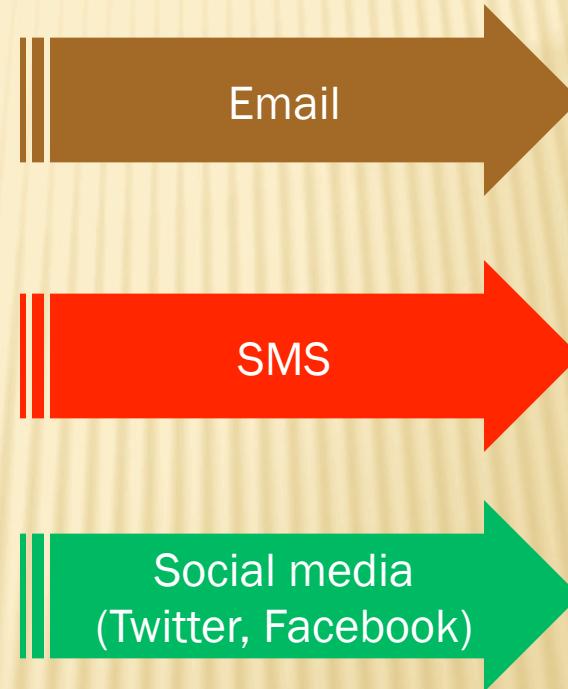
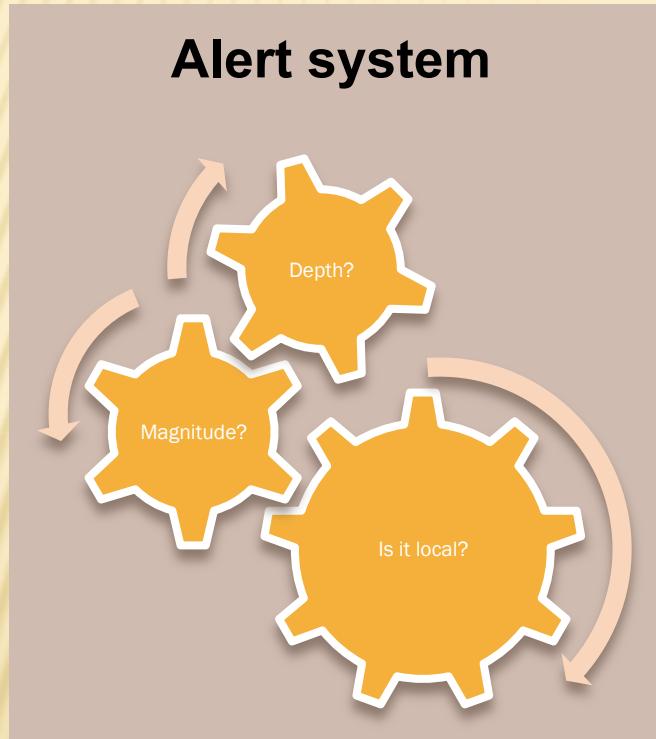
Web Products



Web Server Configuration

Earthquake alert dispatcher

Quake parameters



<https://twitter.com/incdfp>

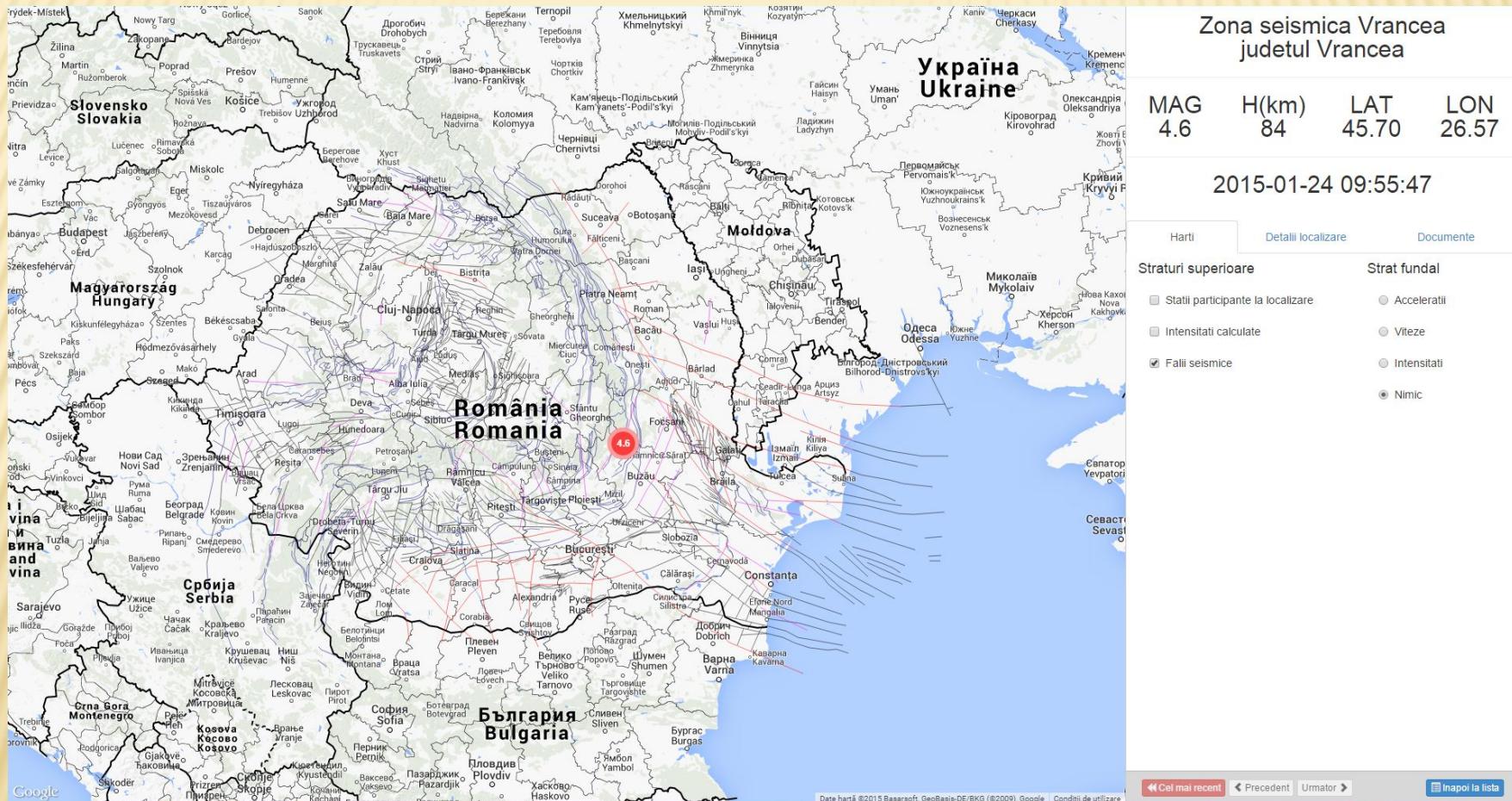
<https://www.facebook.com/cutremure>

Web Products



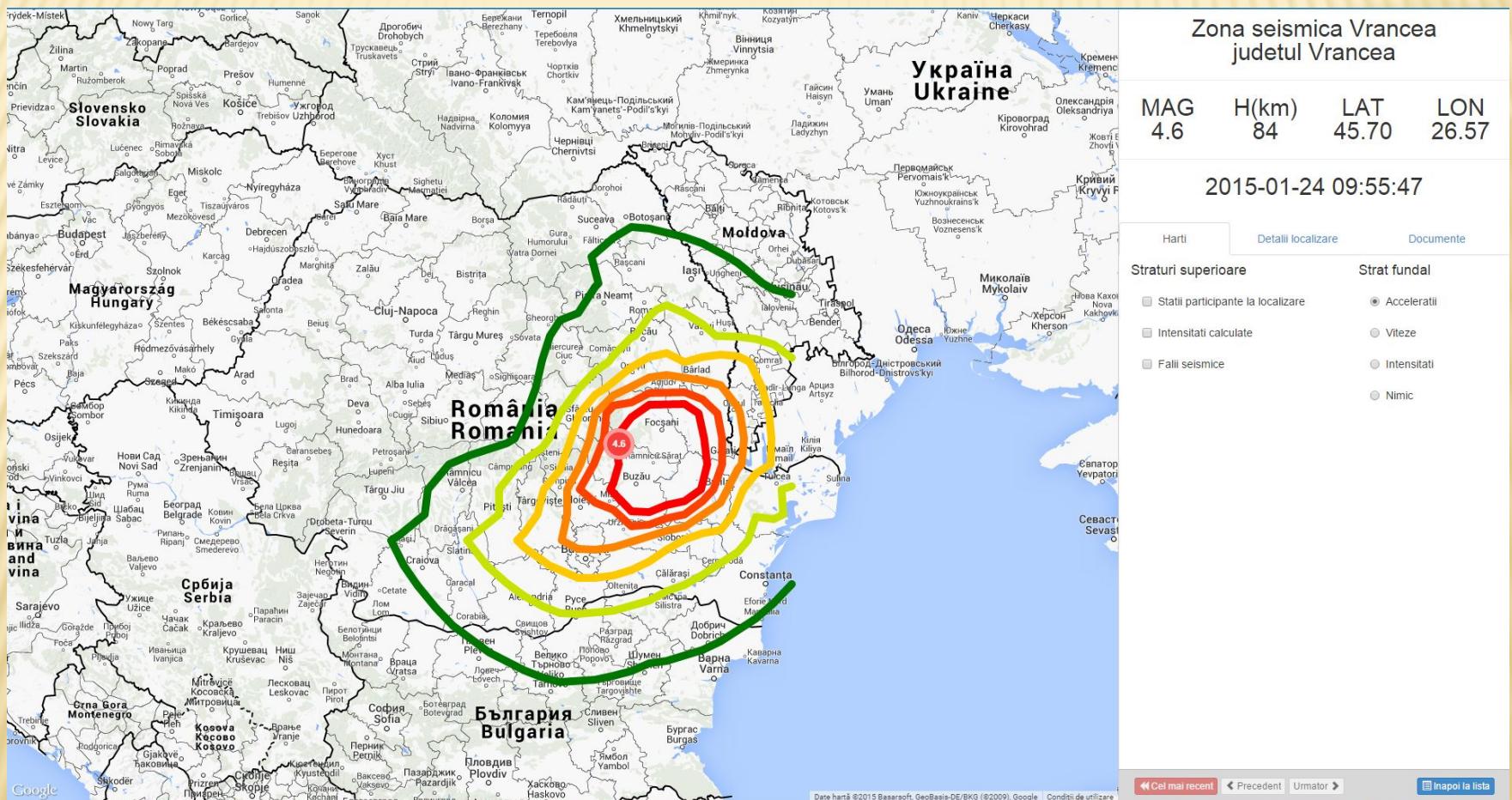
Estimated Intensities

Web Products



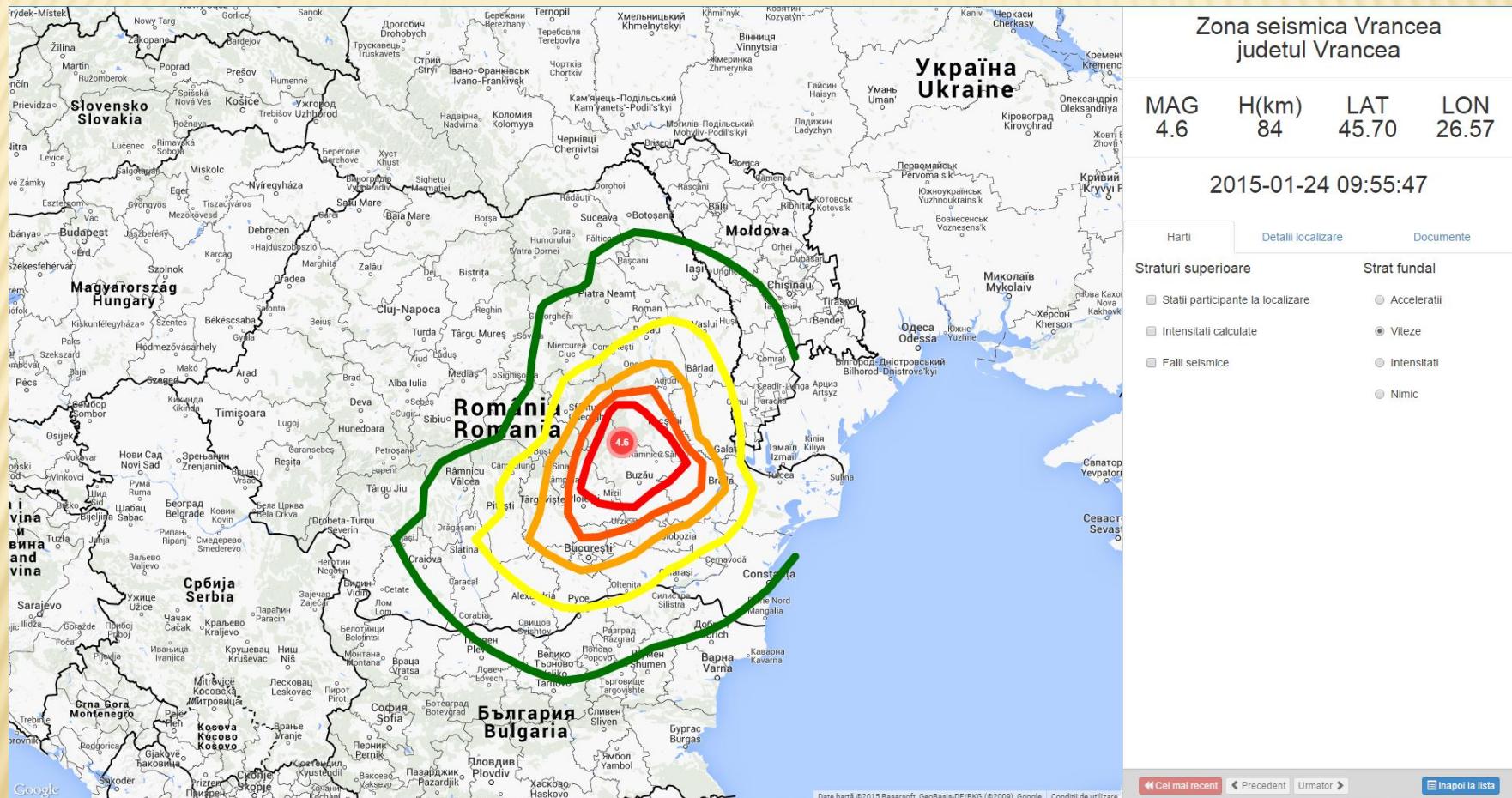
Seismic Faults

Web Products



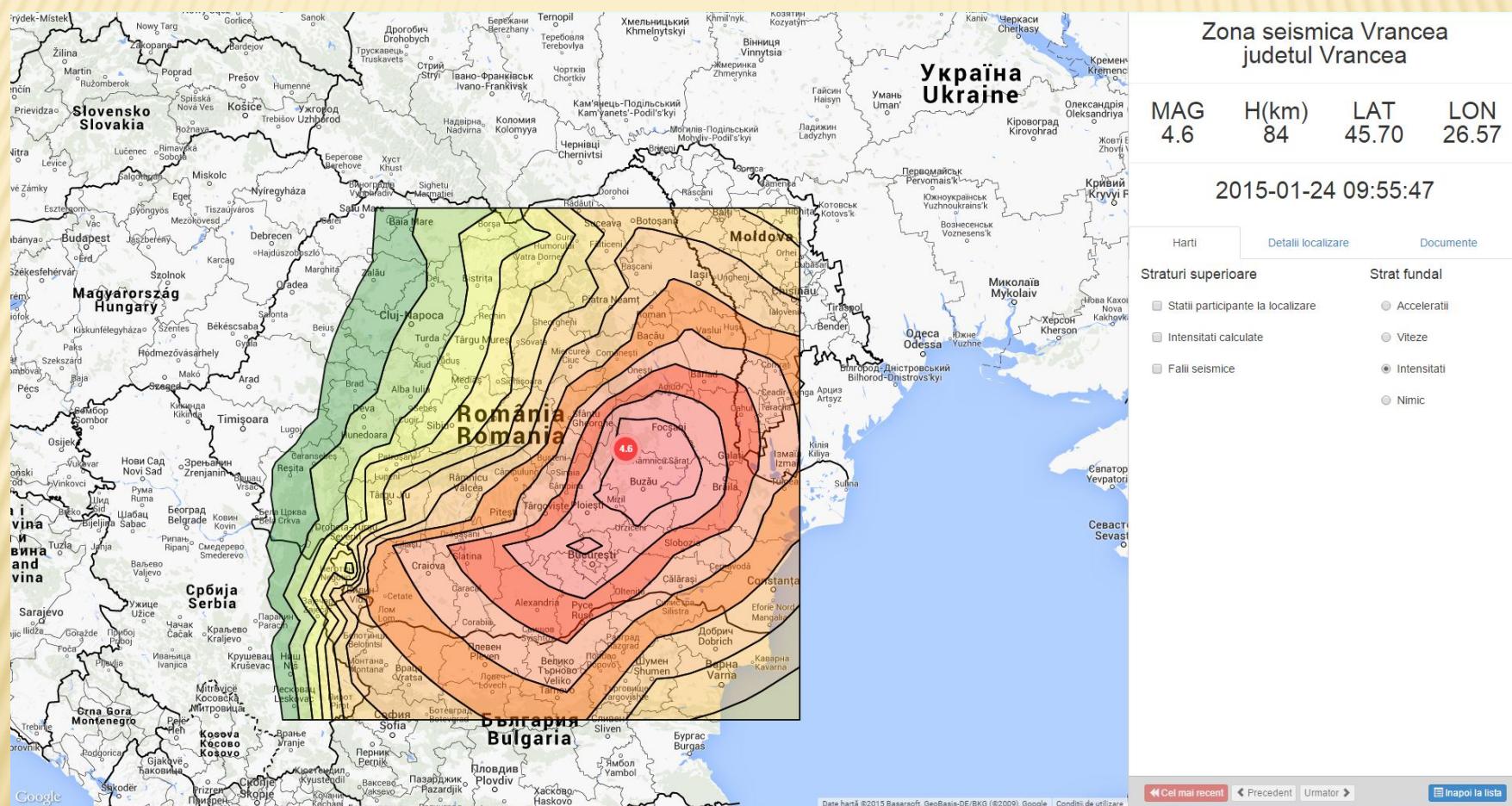
PGA values

Web Products



PGV values

Web Products



Intensity values

Thank you for your attention