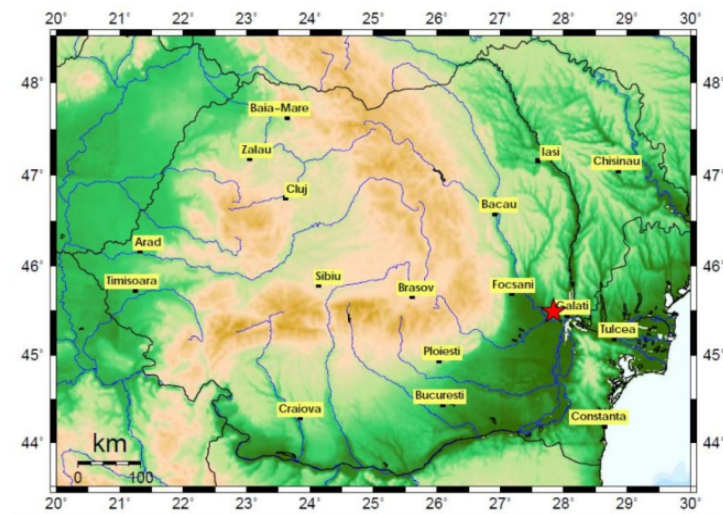


**Earthquake swarm from Galati
- a unique phenomenon in Europe -
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There were over 340 earthquakes taking place around the area of Izvoarele (Springs-there are a lot of underground springs here) starting with September 26, 2013. After three weeks of earthquakes with a frequency that terrified local residents, the number of earthquakes and their intensity gradually decreased and, at the certain moment, they stopped. The telluric movements from Izvoarele, many but at low intensity (according to the measurements) were only surface earthquakes, for this reason being strongly felt by people.



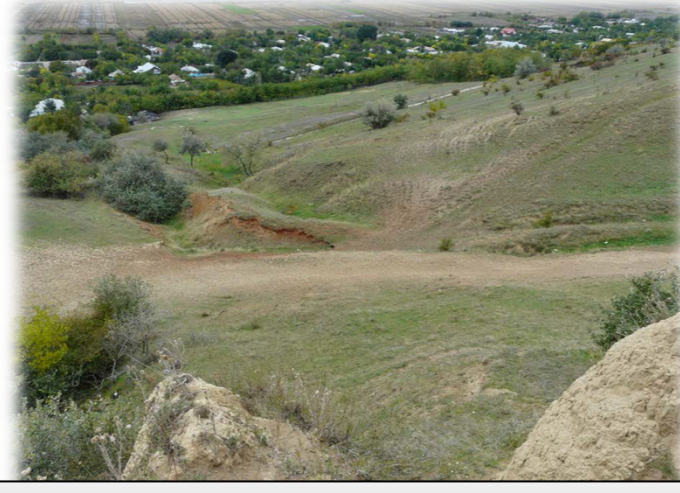
There were THREE ASSUMPTIONS regarding the telluric movements. The possible causes of the phenomenon of land instability around Izvoarele-Slobozia Conachi - could be natural or anthropogenic.

1. MASSIVE FLOODING-NATURAL CAUSES

One week before in Izvoarele area, there had been an orange code of rain and flood. These villages are located over unconsolidated deposits (sands and gravels). These strange phenomena may be attributed to the mechanical suffusion processes that can cause changes in the land surfaces and even reach up to tunnels of suffusion. The suffusion mechanical processes can be triggered (favoured) by seismic activity that can lead to phenomena of liquefaction in the local unconsolidated sands from underground. According to the measurements it has been revealed that the underground zones that may contain water are reduced in number and are located near the soil surface. The water could not penetrate into the epicentre.



Ravine with landslide



Ravine with massive landslide, already detached



Ravines in loess deposits



Suffusion point in loess deposits

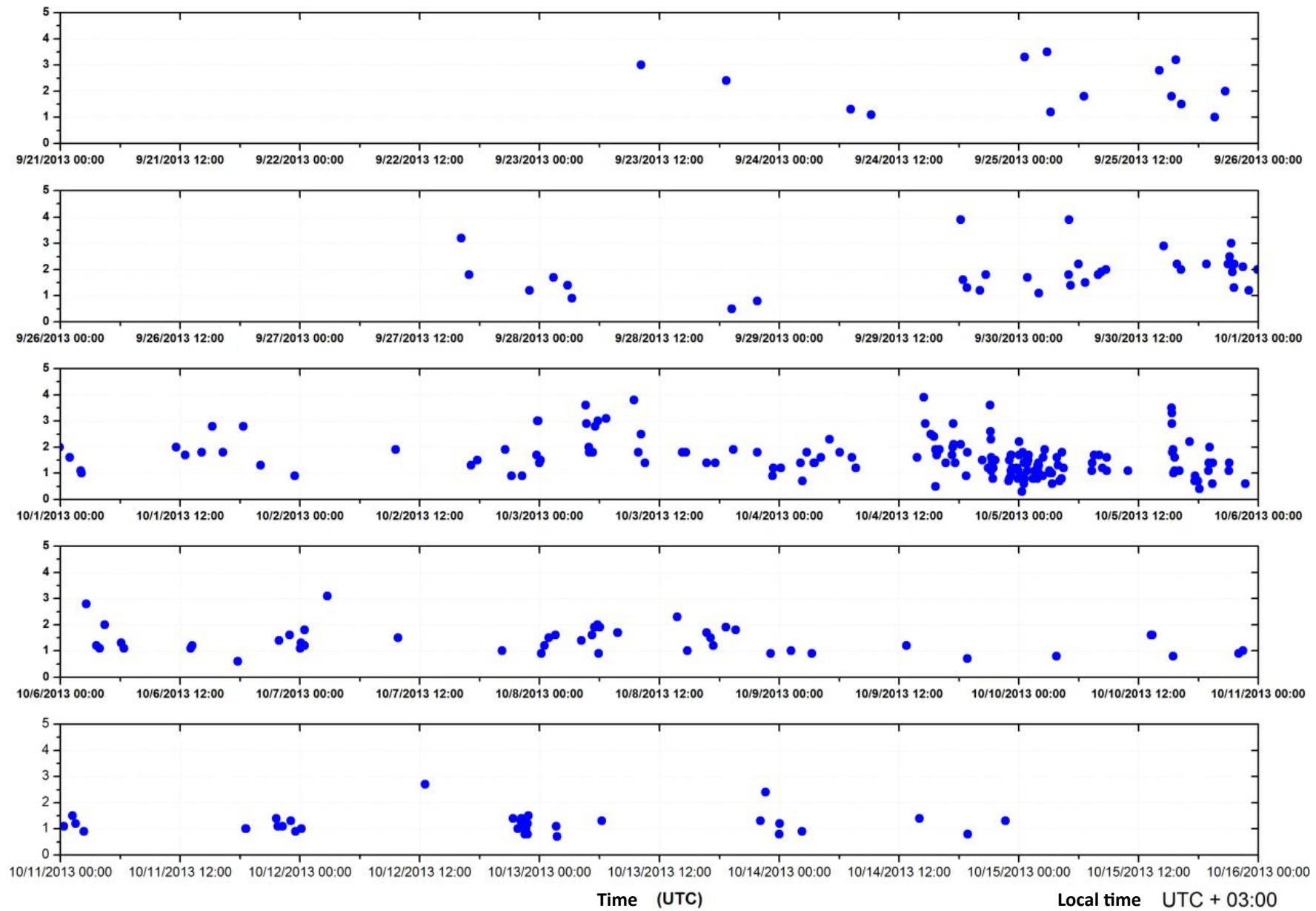
2. OIL DRILLING - ANTHROPOGENIC CAUSES

A possible cause may be the phenomenon of differential land subsidence due to oil and gas exploitation in the three-domed structure on which Slobozia Conachi-Izvoarele localities are placed. Within this oil productive structure, layers (sandy horizons) are at lower depths between 450 and 650 meters. Taking into account the fragility of impermeable sandy levels separating the oil and gas levels, the extraction activity based on injection wells would increase the occurrence of instability phenomena. This process does not exceed a depth of 1,100 meters, while the seismic outbreaks were at around 5,000 meters. 1,100 meters below the drilling there is a very hard rock area, so that no drilling element could penetrate. Up to present the influence of the oil drillings has not been demonstrated.

3. TECTONIC REACTIVATION

Izvoarele-Slobozia Conachi area lies at the intersection of a structural alignment having a NNW-SSE general orientation (with a width of about 8 km) with another tectonic alignment oriented WNW-ESE, consisting of fault, which accompany towards south, the major fault known as Sf. Gheorghe, a dislocation which is part of the major faults that include Peceneaga-Camena, Capidava-Ovidiu and Intra-Moesia. They were reactivated, as demonstrated in the records of the installed equipment: 5 high sensitivity seismometers, a strong motion accelerometer for an acoustic recording system of the sound effects from the village, 7 GPS stations for soil deformation movements, a magnetometer to record the magnetic field and an infrasound station.

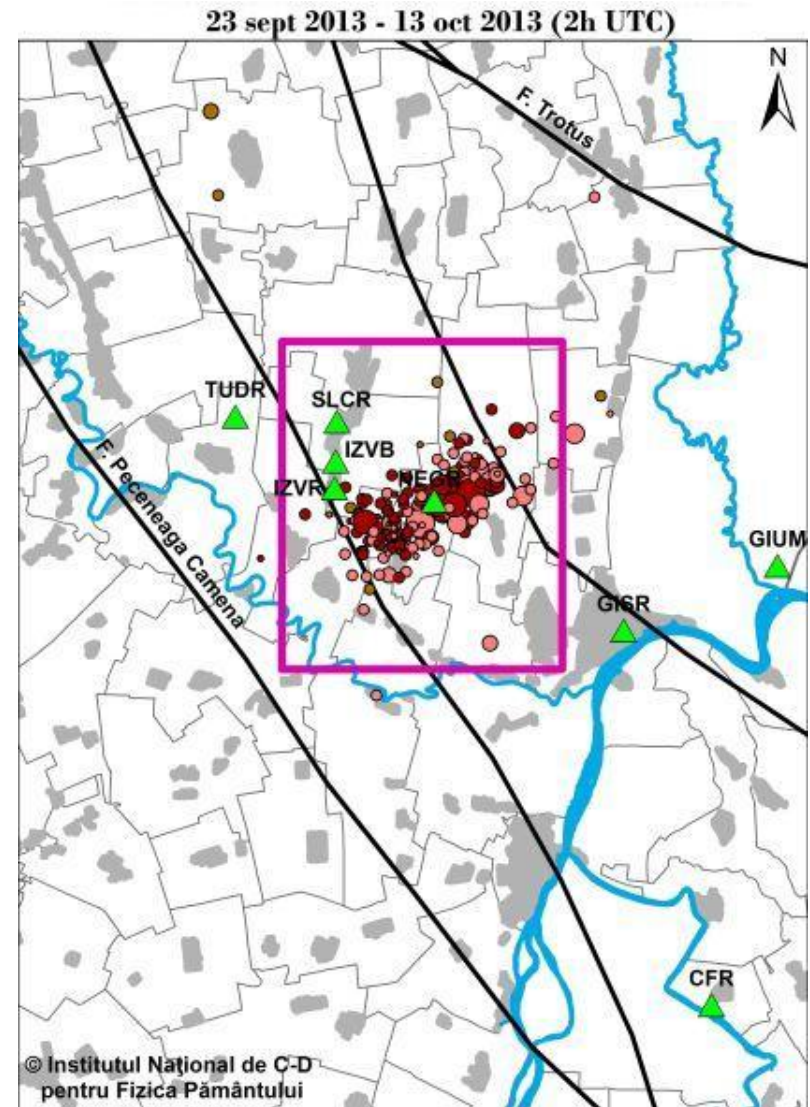
Out of more than 340 earthquakes, 19 were of $ML > 3$ and 40 with $ML > 2$ magnitude. The strongest earthquake recorded in Galati during this period had 3.9 degrees and occurred on September the 29th, 30th and October the 4th.



The sequence of earthquakes which happened in Galati was of an earthquake-swarm type with distinctive characteristics of these seismic processes:

- it cannot be distinguished an event with magnitude significantly different from the other events
- the releasing of tectonic energy is done over a period that can vary from several days to several months
- calmer periods alternate with periods of seismic intensification
- there have been reported sound effects such as those recorded in the village ("boom earthquakes")

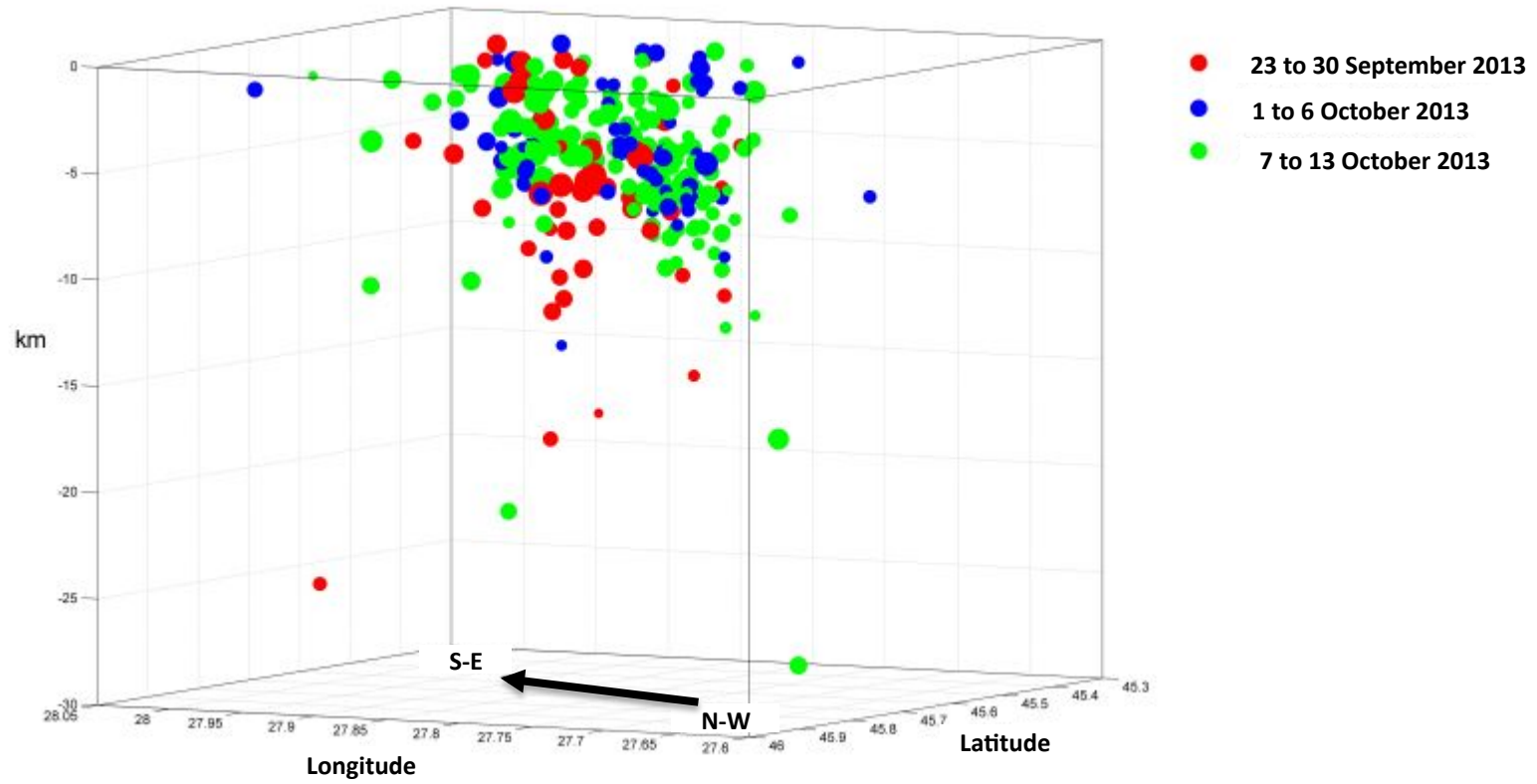
The earthquakes that make up the seismic swarm, triggered on 09/23/2013, are aligned on a NE-SW direction. The alignment is perpendicular on the main fault system Peceneaga Camena (south) / St. Gheorghe (north).



Earthquakes in Galati - Izvoarele area



Focal depths are almost 95% located in the range of 1 to 7 km.



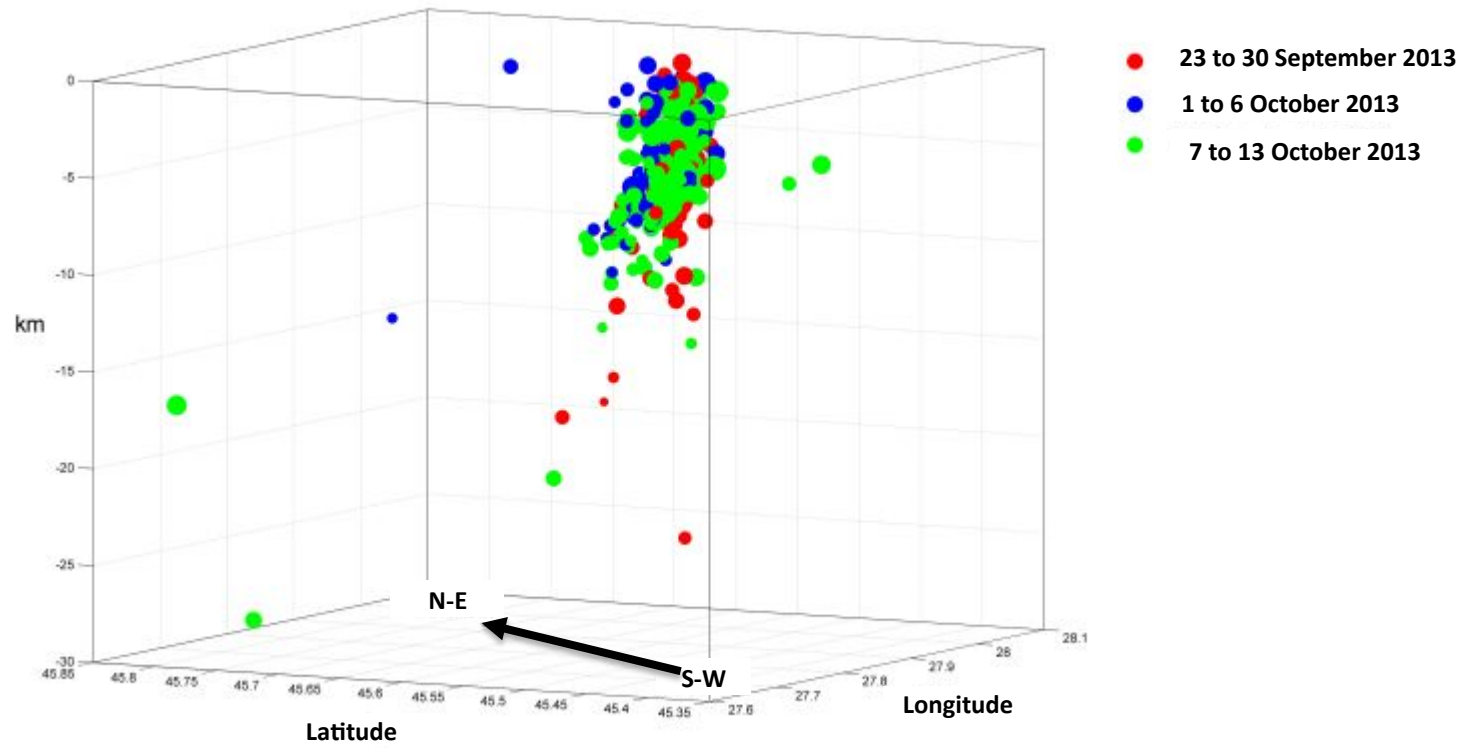


Table 1 Accelerations and speeds registered at Izvoarele station

Earthquake		Izvoarele station					
		Acceleration (cm/s ²)			Speed (cm/s)		
Origin time	Magnitude (M _L)	Comp. Z	Comp. N	Comp. E	Comp. Z	Comp. N	Comp. E
3.10.13 4:37:40	3,6	36,5	3,48	34,4	0,43	0,11	0,74
3.10.13 05:52:50	3,0	11,0	0,64	5,99	0,13	0,015	0,11
3.10.13 9:27:41	3,8	32,0	4,78	18,7	0,37	0,093	0,43
4.10.13 14:29:27	3,9	35,3	7,4	35,8	0,42	0,29	1,59
4.10.13 21:08:11	3,6	14,2	13,4	7,97	0,14	0,057	0,17
5.10.13 15:19:08	3,5	13,9	4,39	19,5	0,2	0,13	0,56
5.10.13 15:20:20	3,3	7,34	1,8	6,93	0,088	0,062	0,18
7.10.13 02:44:10	3,1	11,6	1,02	8,52	0,14	0,022	0,17

CONCLUSIONS:

According to the conclusions of the scientific report on the earthquakes from Galati, the main cause of these is a tectonic one, but the shallow groundwater "amplified" the sound signal and affected at a higher level some of the houses in the village Izvoarele.

The effects found in the Izvoarele village are of an unusual large magnitude for earthquakes up to 4 degree.

They are due to the following factors:

- the local effects of amplification of seismic waves due to ground conditions of Izvoarele Village
- local amplification effects due to the topography of the village
- cumulated macro-seismic effects through repeated seismic waves on buildings
- these earthquakes reactivated a fault or a system of faults in area of Suhu valley, allowing the surface water to infiltrate to deeper areas, which had been dried by then.

Sound of earthquake



Source:

sunet cutremur2.wma

http://www.romaniatv.net/media_139571_sunetul-cutremurelor-din-galati-asculta-cum-trosneste-pamantul-video_101346.html

Thank You!