Seismicity in the southern part of the Harghita Mountains and its possible correlation with recent volcanic activity

Popa M.[1], Radulian M.[1], Szakács A.[2,3], Seghedi I.[2] and Zaharia B.[1]

[1]*National Institute for Earth Physics, Bucharest-Magurele, Romania*
[2] *Sapienţia University, Dept. of Environmental Sciences, Matei Corvin str., 4, RO-400112 Cluj-Napoca, Romania*
[3]*Institute of Geodynamics, Romanian Academy 19-21, Jean-Luis Calderon str., RO-020032 Bucharest, Romania*

The southern part of the Harghita Mountains, in the South-Eastern Carpathians represents the site of the most recent volcanic eruptions from the entire Carpathian-Pannonian region. The products of these eruptions were dated using radiocarbon method ranging 42–10 Ka. The composition of the magmas is high-K calc-alakaline with adakite-like features, characteristic for a post-collisional regime. Ciomadul, the most recent volcano at the southern end of the Harghita Mountains, is situated in the southernmost prolongation of the Călimani-Gurghiu-Harghita range along the inner part of the South-Eastern Carpathians started about 11 Ma ago in the Călimani Mountains and migrated in time and space from NW to SE. Ciomadul volcano is located in the rough proximity of the Vrancea seismic zone (a shift of about 60 km toward NW) and its magma generation is attributed to the geodynamic events closely related to the seismogenic area. Recent investigations show a number of particular geophysical and geochemical features located in the study region including: 1) the abrupt attenuation of the seismic waves coming from the Vrancea intermediate depth foci for paths going towards the southern edge of the Harghita Mountains, 2) the most intense heatflux anomaly in the whole Romania, 3) the most prominent $^{3}He/^{4}He$ anomaly measured in natural gases and thermal mineral waters, are all in favour of the hypothesis of a still existing local hot magma chamber. Until recently, very few earthquakes were recorded in this area. Data acquired during recent seismicity monitoring of the Vrancea zone, also benefited from the stations installed in the interior of the Carpathian bend area suggest a possible enhancement of the local seismicity beneath the southern edge of the Harghita Mountains, both in the crustal and subcrustal levels. At the same time, recent tomography images obtained using local earthquake data correlate well with the presence of a vertical low-velocity material coming from the upper mantle to the assumed magmatic chambers located in the crust.

The purpose of the present paper is to investigate the seismicity patterns in the crust and in the mantle at the inner side of the SE Carpathians, with special focus on the southern Harghita Mountains volcanic area looking for possible correlations with most recent volcanic activity. At the same time, our goal is to integrate the results in a global and coherent geodynamic model and to provide on this basis a first framework for hazard assessment related to possible future activity in Romania.

The stylopodium and zeugopodium of *Mammuthus meridionalis* (Nesti) discovered at Leu, Dolj County (Romania)

Popescu A.

Muzeul Olteniei, str. Popa Şapcă, nr. 8, Craiova, Romania

The paleontological deposit from Leu, discovered in 1998, is situated 25 km southeast from Craiova (South-West of Romania). This deposit is located on the right slope of the Frasin Valley, at about 10 m height as against the stream of water, in a sand and gravel quarry.

The paleontological content is the following: *Mammuthus meridionalis*, *Stephanorhinus* group *etruscus*/*hundsheimensis*, *Equus stenonis* Cocchi, *Leptobos etruscus* Falconer, *Leptobos* sp., *Eucladoceros* sp., *Castor plicidens* Major, *Ursus etruscus* Cuvierand a few coproliths belonging to a canid.

The mammalian association from Leu was attributed to Pleistocene, namely to the zone MN 18.

The fauna discovered at Leu is similar to the ones already described, located in several deposits in Oltenia – Irimesti (Mitilan's Fountain), Tetoiu (Bugiulesti) – horizon 2 – and from the Romanian Plain – Prundu.

In Eastern Europe, the fauna from Leu is equivalent to the fauna from the Odessian Complex, which contains the same large mammals. In Central Europe, an equivalent could be the Kisslangian level in the Netherlands, the correspondent could be represented by the Eburonian level. In France and Italy, the equivalents are the faunas from Senèze and Olivola.

Most of the fossil samples (over 90%) discovered at Leu belong to the species *Mammuthus meridionalis*: three mandibles, two upper M3, 24 vertebrae, numerous ribs, carpians, metacarpians, tarsians, metatarsians, patellas, and phalanx. To these elements, the bones of stylopodium and zeugopodium are added: one humerus, one radius, one cubitus, one femur, six tibias and two fibulas.

The humerus of *M. meridionalis* discovered at Leu is reconstituted from several fragments and it presents deteriorations at the cranial side of the proximal extremity. It is characterized by massiveness and poor relief. The head is low and broad.

Unfortunately, the ulna is rather deteriorated.

The radius discovered at Leu is reconstituted out of several fragments and it presents deteriorations at the proximal extremity; the distal extremity is missing.

The femur discovered at Leu is characterized by the following peculiarities: relatively short diaphyse, under-developed head and badly emphasized condyls.

The six tibias of *M. meridionalis* from Leu are massive and rectilinear. The proximal extremity is the greatest portion of the bone. The shaft of the bone has a prismatic shape in the proximal half, while in the distal half is closer to a cylindrical shape. The distal extremity displays a cochlea for the articulation with the astragal.

In Romania, *M. meridionalis* as a species is relatively frequent at the level of Pleistocene, but descriptions of the post-cranial skeleton undertaken so far are scarce and extremely concise.

This research is a contribution to the better knowledge of the post-cranial skeleton of the *M. meridionalis* species.

New data regarding the resources of tellurium and its distribution in the waste dumps and tailing dam from the Certej-Sacaramb ore deposit, Metaliferi Mts., Romania

Popescu C.Gh.[1], Cioacă M.[2], Neacşu A.[1], Filipescu D.[3] and Orlandea E.[3]

[1]Dept of Mineralogy, Faculty of Geology and Geophysics, Universiy of Bucharest, 1, N. Balcescu Blvd., Bucharest, ghpop@geo.edu.ro, antonela.neacsu@gmail.com
[2]Geological Institute of Romania, 1, Caransebeş Street, 012271, Romania mihaela2012@yahoo.com
[3]S.A.Deva-Gold S.C. flip58ro@yahoo.com

The Sacaramb ore deposit is located in the so-called 'Golden Quadrangle' area situated in the Metaliferi Mts. and it is the most important Au-Ag tellurides deposit in Romania and in Europe, too. Genetically, it is a hydrothermal vein deposit with Au-Ag tellurides. The ore veins are located in an andesitic stock (pyroxene andesite of Sacaramb) generated by the Neogene calc-alkaline magmatism in the Metaliferi Mts. The vertical extension is about 600 m and the surface of this stock is ca. 1 km^2. Over 100 mineral species have been identified in the Sacaramb ore deposit, some of them firstly described in the world (nagyagite, petzite, krennerite, stuetzite, muthmannite, museumite). Till recently, tellurium was interesting only from scientific–mineralogical point of view and there was no interest for resource estimation in Romania. Since 2005 this element started to be considered as an important one, when the company "First Solar", USA used it in the construction of solar panels with photovoltaic cells based on Cd-Te technology.

The first estimation regarding tellurium resource of the Sacaramb ore deposit was made by Udubaşa & Udubaşa (2004), taking into consideration Au/Te ratio, (i.e 1/2) into the most common tellurides - nagyagite and sylvanite (1/2 ratio) and the amount of gold extracted from Sacaramb ore deposit (over 1746-1941), calculated as being ~ 30 t Au. Therefore, the amount of Te mined and unprocessed (i.e. just dumped) would be ~ 60 t.