

SEISMICITY AND MUD VOLCANISM IN ROMANIA

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In the geological structure of the Romanian territory, two main geotectonic categories can be discerned: platforms and orogenic belts. The extremity of the Precambrian Eastern European Platform (EEP) was delimited in the north-eastern part of the country. To the south, the EEP is in contact with a Paleozoic stable area, divided into two units – the Scythian and the Moessian Platforms. The North-Dobrudja Massif has an intracratonic position within the Moessian Platform. The Carpathian Orogenic Belt covers more than half of Romania's surface. Its structure is very complicated, being one of the most complex segments of the European alpine belt. The mountainous chain consists of three branches: the Eastern Carpathians, the Southern Carpathians and the Apuseni Mountains. At the interior of the bended Carpathian chain, there are large post-tectonic low areas: the Transylvanian and Pannonian Depressions.

In its external part, the Carpathian chain is bordered by thick molassic deposits belonging to the foredeep. Important hydrocarbon reservoirs occur in this tectonic unit. In the Transylvanian Depression, only methane accumulations are known.

The most important seismic zone in Romania is Vrancea region, where intermediate-depth earthquakes, with magnitudes up to 7.4 were recorded. This is a particular earthquake prone area by respect to its isolation and seismic patterns, being comparable only to Bucaramanga (Columbia – Southern America) and Hindukush (Central Asia). Some less important epicentral areas are located in other regions of Romania. All of them are normal-depth and low energy seismic areas. Extensive seismological research regarding the Vrancea region is performed. The studies shown that the foci are distributed within a quasi-vertical zone, down to about 200 km. The aggregate of geophysical and geological data concerning the zone suggest the presence of a sub oceanic lithosphere fragment, tilted towards north-west. It seems that its movement, caused by the push of the Black Sea microplate, triggers the earthquakes in Vrancea.

The biggest mud volcanoes in Romania are located on the Berca-Arbanasi hydrocarbon-bearing structure (Eastern Carpathians Foredeep). This structure is located very close to the epicentral Vrancea zone. The Paclele Mari (PMA) and Paclele Mici (PMI) areas were declared natural reserves since 1924. These are also the most impressive mud volcanoes in Europe. Their activity is generally quiescent. But in some situations, an intermittent explosive activity was reported. In the Beciu area, north of PMI, an eruption, with the mud column attaining 1-m height for 24 hours, was observed in November 1976. In the 30 days of eruption, about 5000 tons of mud flew out. In the 1977 strong earthquake (M: 7.2) the eruption was reactivated for 6 hours. No regular studies regarding the relationship between the seismic and mud volcanoes activities were conducted until now. Gas emissions without mud, generating everlasting fires in case of high fluxes, are also known in different

