SEISMOTECTONICS OF MUD VOLCANISM REGIONS OF EAST GEORGIA

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The paper represents one of the first attempts to correlate mud volcanism and seismic activity in East Georgia. The region of mud volcanism is located within the western part of the Middle Kura intermontane basin. The sedimentary fill of the basin reaching 13 km in thickness comprises two complexes, pre-inversion and post-inversion, transgressively overlying the crystalline basement. The lower complex (Jurassic-Eocene) is made up mainly of marine terrigenous, volcanogenic and carbonate rocks. The upper complex (Oligocene-Quaternary) is represented by up to 6 km-thick molasses formations consisting of predominantly clayey rocks in lower part, and coarse-grained rocks at the top; mechanically these rocks are largely friable, poorly cemented, often unconsolidated.

The deep structure of the basin is characterized by a significant structural unconformity between the two complexes. The structure of the lower complex is comparatively simple. The molasses complex, on the contrary, is subjected to intensive tectonism being deformed into a series of linear recumbent folds and/or thrust sheets displaced from N to S (the so-called Kartli-Kakheti allochthon). The main detachment plane confining the allochthon at the base passes within the highly plastic clays of the Maikop series (Oligocene-Lower Miocene).

All the mud volcanoes of East Georgia are arranged in several linear zones spatially coinciding with the above-mentioned anticlinal lines and fault dislocations. Among rock fragments ejected by mud volcanoes are those from Quaternary to Cretaceous but the most frequent are Oligocene, Miocene and Pliocene rocks.

The presence of Cretaceous rocks may be connected with nappe sheets composed of Mesozoic sequences overlapping buried folds made up of Oligocene and younger formations. It seems most likely that the roots of mud volcanoes in East Georgian are in plastic clays of the Maikop series which are also characterized by other factors generally regarded as favorable for mud volcanism: the presence of underground water, accumulations of natural gas and fluid oil anomalous high rock pressure.

Most of earthquakes registered in the basin are small-to-medium sized shocks with magnitudes generally less than 4. As a rule, they are shallow, with sources within the sedimentary cover and even in the molasse complex. Some of these shocks occur on the same faulty with which mud volcanoes are associated. It seems quite probable that the displacement along faults that induce earthquakes may also be responsible for the mud volcano activity.

As for deeper earthquakes whose foci are located in the lower part of the sedimentary layer and in the consolidated crust, they are not, in our opinion, genetically related to mud volcanism processes although some of strong shocks may provoke the activization of individual mud volcanoes.