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Estimations of deep structure and seismic hazard in the Eastern part of Intramoesian fault on the basis of geological and geophysical data with aid from low-frequency microseismic sounding

E.A. Rogozhin (1), Yu.V. Kharazova (1), **A.V. Gorbatikov** (1), M.Yu. Stepanova (1), S. Shanov (2), A. Mitev (2)

(1) Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Moscow, Russia (eurog@ifz.ru, phone/fax: +7 495 2548752), (2) Geological Institute, Bulgarian Academy of Sciences, Sofia, Bulgaria

The Intramoesian fault divides the Moesian plate in North-Western direction. It can be recognized on the Earth's surface from Carpathian deflection in North-West (Romania) to the Black Sea coast near the places of Shabla and Vaklino in South-East (Bulgaria). This fault passes to south by the city of Bucharest at a distance about 40 km, the nuclear power plant Chernovoda (Romania) at a distance 60-70 km, about 20 - 25 km from the city of Dobrich and just a few kilometers from populated places like the city of Silistra, General Toshevo, Shabla (Bulgaria). Considering its extended length this fault may have represent the significant source of seismic hazard (with maximum expected magnitude up to M = 8). Taking into account the potential hazard of the Intramoesian fault there has been established the bilateral Russian-Bulgarian scientific cooperation in order to perform detailed study of the structure and paleoseismic evidences of seismic activity of the Intramoesian fault on the Bulgarian territory. In 2006 there were carried out field works in South-Eastern Bulgaria including determination of exact spatial positioning of the fault, its deep structure and seismic potential estimation in the Eastern part of the Intramoesian fault. The experimental research has been accomplished by means of geomorphology and seismotectonic mapping in combination with low-frequency microseismic sounding and extensive usage of geological

and geophysical data archives for the given territory. It has been shown that studied part of the fault consists of several almost parallel branches. Regional topography demonstrates dry shallow linear depressions not correspondent with any river valleys. In the bottom and sides of these depressions sometimes developed clustic Quaternary deposits. Collected trenching data demonstrated geological activity of the fault since several thousand years ago. Branches of the fault zone over-crossed by younger fault-like structures, also like in relief as narrow linear depression of N-S orientation. In bottom of these longitude depressions sometimes exist small rivers or streams. In some places these more active faults shifted more old segments of the Intramoesian fault branches as right-lateral strike-slips with amplitude up to 1-2 km. The young intrusion in the basement of the plate has “sealed” western segment of Intramoesian fault and changed the situation with distribution of stresses in this part of the faults system. Besides study of regional deep structure (up to 40 km) along 3 profiles with microseismic sounding explicitly shows the absence of general rupture along initially supposed direction, but reveals the crossing faults with N-S orientation. Thus, the studied part of Intramoesian fault is estimated as low-active from geological and seismic points of view while present day activity is correspondent with faults of longitudinal stretch where one historical earthquake with magnitude ˜7 has been determined by the trenching methods.