

Studying the Geophysical and Geological Environment of Earthquakes Using Geographic Information System Tools

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In the Pannonian Basin earthquake generations are not sufficiently explained in the point of occurrences (namely several earthquakes can not be reduced only to map indications of recent tectonic movements), therefore Geoinformation System has been elaborated in order to analyze the geo-environment of earth tremors. The special seismological GIS includes all relevant information (maps and joint database) concerned with earthquakes covering the whole territory of Hungary. GIS contains the following maps: special historical- and instrumental epicenters (filtered events) and their parameters; active faults in the Pleistocene; active faults in the Tertiary; digital terrain models of recent relief, Lower Pannonian bedrock, Upper Pannonian bedrock, Pre-Tertiary basement; recent water streams; Pleistocene sediment thickness. GIS enables to perform special operations between different layers by applying its tools in order to reveal the recent tectonic movements and to throw light upon the generation of possible earthquake occurrences.

Results of our investigation revealed that significant relation exists between the earthquake foci and recent tectonic lines. Some foci, however, can not be related to faults. One part of earthquakes which can not be related to faults showed good agreement with Tertiary basement areas of considerable slope. On the sloping borders of Tertiary basements by the measurement of the pore pressure in boreholes we found that numerous earthquakes occurred on the sloping parts of Pre-Tertiary basement are in relation with overpressure areas as well.