

ANALYSIS OF TECTONIC AND GEOMORPHOLOGICAL VARIATIONS USING GIS

Czirok L.¹, Bozsó I.², Gribovszki K.^{2,3}

¹*University of Sopron, Roth Gyula Doctoral School, Sopron, Hungary*

²*MTA CSFK Geodetic and Geophysical Institute, Sopron, Hungary*

³*University of Vienna, Faculty of Earth Sciences, Geography and Astronomy, Department of Meteorology and Geophysics, Hungary*
cziroklili@ggki.hu

The SE-Carpathians are of a great interest to the geoscientists on the Eurasian plate. Firstly, the youngest volcano in the Carpathian Basin can be located here. The name of this volcano is the Csomád (Ciomadul). Secondly, the largest seismically active region is the Vrancea-zone in Europe. These areas are indications of the still ongoing subduction.

More geophysical and geodetic measurements were carried up in these regions (e.g. seismic, magnetotelluric, GPS-measurements, etc.) [1, 2, 3, 5]. We have decided to create a so called Seismotectonic Information System using GIS. For this reason surface deformation velocities of interferometric synthetic aperture radar (InSAR, e.g. ENVISAT), focal mechanism solutions (FMS), stress data derived from FMS and thematic maps (e.g. tectonic map) have been collected.

Quantum GIS (QGIS) was used in order to illustrate and analyse the data. Recently, we have tectonic maps, SRTM, focal mechanism solutions from 1979 until now, principal stress data derived from FMS [4] and archive ENVISAT-images. The figure presents the Seismotectonic Information System in QGIS.

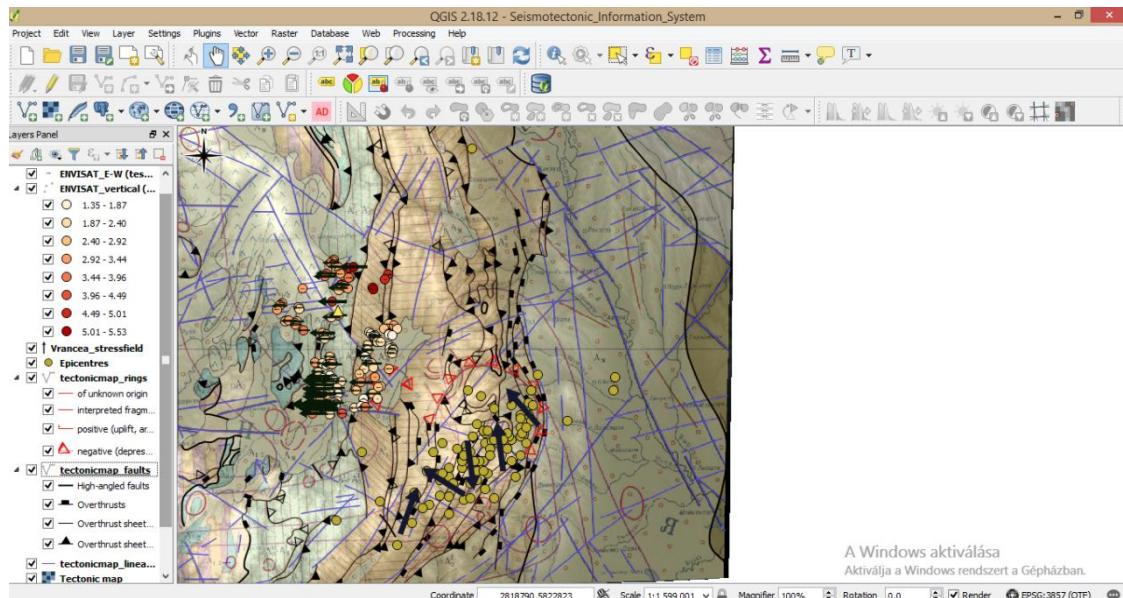


Fig. The current Seismotectonic Information System in the South-eastern Carpathians. The Csomád (Ciomadul) volcano is on the western part (yellow triangle). In the vicinity of Ciomadul, there are vertical- (red scale bar) and E-W (black arrows) velocities from ENVISAT-images. On the eastern part, there are epicentres (brown circles) and main stress field orientations (bold dark blue arrows) in the Vrancea-zone. The black lines with the black triangles indicate the overthrusts, violet lines present the lineaments and red curves illustrate the tectonic ring structures (anticline, syncline).

The aims of this information system are on the one hand to analyse simultaneously the different information of this area saved in the different thematic layers of the GIS and on the other hand to understand the surface deformation due to crustal-mantle processes comprehensively. Based on the data, it can be verified that the subduction is ongoing but the tectonic and geomorphological situation is complicated. Therefore, we need more measurements, more seismological data, more geomorphological information and other thematic maps (e.g. topographical maps, DEM, map of Neogene Quaternary Formations). Moreover, we have to control the quality and reliability of current data. We hope that this information system help us to comprehend the different processes and the surface deformation due to them in the SE-Carpathians.

References

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