



## Session 03

---

### Topo-Transylvania: a multidisciplinary cooperation to investigate the geodynamics of the Carpathian-Pannonian Region

#### **Conveners:**

**István János Kovács<sup>1</sup>, Mircea Radulian<sup>2</sup>, Sierd Cloetingh<sup>3</sup>, Liviu Mațenco<sup>3</sup>**

<sup>1</sup> *Institute of Earth Physics and Space Science, Budapest, Hungary*

<sup>2</sup> *National Institute for Earth Physics, Bucharest, Romania*

<sup>3</sup> *University of Utrecht, Department of Earth Sciences, Utrecht, The Netherlands*

Topo-Transylvania is a multi-disciplinary international cooperation, affiliated with Topo-Europe and International Lithosphere Program, that includes several lines of research aiming at monitoring and understanding the processes driving a geodynamically active, complex and critical part of the European continent. The SE Carpathians shows a number of active geodynamic processes of great societal relevance (i.e., large magnitude, intermediate-depth and crustal seismicity, recent volcanism, post-volcanic phenomena, focused geothermal activity). The investigation of the study area is achieved by the application of a number of methods and techniques including: 1) monitoring Earth's active topography using state-of-the-art high-resolution space geodetic techniques; 2) investigation of the large-scale lithospheric architecture beneath the Carpathian Bend area by means of seismic tomography, receiver function analysis and new electromagnetic deep-soundings; 3) geochemical investigation of lithosphere materials by: a) petrological study of upper mantle xenoliths and volcanic rocks with special focus on volatiles (H<sub>2</sub>O, CO<sub>2</sub>, noble gases) trapped in fluid inclusions and nominally anhydrous minerals; b) continuous high-resolution geochemical monitoring of ongoing deep-source CO<sub>2</sub>-rich gas emanations (concentration of infrared active gases (CO<sub>2</sub>, NH<sub>3</sub>, CH<sub>4</sub>, CO, H<sub>2</sub>S etc. and R<sub>d</sub>) and springs to acquire dense and uninterrupted time series complemented by magnetotellurics, seismic and meteorological time series; 4) analogue and numerical modelling of active lithospheric processes combined with inferences of the recent pargasosphere hypothesis to acquire a better insight into the coupling between volcanism, CO<sub>2</sub>-rich gas emanations, active surface topography and its link to deep upper mantle, as well as the origin of large magnitude intermediate-depth earthquakes in the SE Carpathians.