Interactions of Earth's surface and deep processes in the active geodynamic areas of high seismic risk. Carpathian example

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Southeast Europe represents a key natural laboratory for research on the quantification of the neotectonic processes, development and validation of a new generation of models for the ongoing orogeny and its obvious effect on the dynamic topography. The Pannonian-Carpathian system represents an area of significant natural hazard risk in Europe where, in addition to landslides, flooding and earthquakes, human activities contribute to stress the complex environment. The currently running research is process-oriented. It can improve the understanding of what determines the present day situation and generates active changes in the sedimentary input into the basins and thus affecting the entyre regional dynamics of the upper globe. An integrated and strategic management of interdisciplinary research activities in the field of Earth Sciences designed and carried out in a synergetic way is needed for the mitigation of the highest natural hazard in Southeast Europe.

Inherited orogenic patterns probably control the distribution of neotectonic activity and the location/dynamics of the natural hazards of all types. The final stages of continental collision are characterized by frequent episodes of structural inversions, leading to vertical movements at regional and local scales. This is associated with significant changes in recent lithosphere dynamics, tectonic topography, landscape evolution, and climate inversions.

Southeast Europe provides one of the best natural laboratories in the world for the regional-scale integrated assessment of an entire orogenic back-arc system, addressing interactions between active mountain uplift processes, through drainage networks to active on and offshore basins. The incorporation of long-term and deep lithospheric processes into a study of natural hazards represents a major challenge for geosciences. Quantifying the links between lithosphere dynamics, neotectonics and surface and climate processes is a key target through the development of numerical models, making use of data sets that cover different aspects of these phenomena at a wide range of scales.