



## **The topography of the Romanian Carpathians: the interaction between tectonics and surface processes in landscape evolution**

Simone Sperini (1), Paola Molin (2), and Valentina Nicole Scotti (2)

(1) Via dei Telegrafisti 50, 00143 - Roma, (2) Università degli Studi "Roma Tre", Dipartimento di Scienze geologiche, Italy (valenkaja@fastwebnet.it)

First-order topographic features in a tectonically active landscape including relief, drainage patterns, and stream gradient slope represent ways to quantitatively characterize the interaction between tectonics and geomorphology, providing a basis for modelling landscape evolution. We analyzed the topographic features of the Romanian Carpathians, a mountain range characterized by two straight segments connected by a narrow curvature zone. Previous studies contain information on denudation and uplift rates. We examined the tectonic geomorphology of the Romanian Carpathians focusing on regional and local topographic settings, drainage pattern and stream long profiles. Our main data base is composed of DEM-based topographic analyses, supplemented with field investigations of fluvial terraces and low relief upland surfaces in the Slanic R. basin, a drainage located in the Carpathian curvature. The results are consistent with a landscape dominated by a regional heterogeneous and diachronous uplift superimposed on crustal tectonics, extensional on the internal side and compressive on the external one. The differential uplift of the Romanian Carpathians influenced the elevation of the chain, its local relief, the concavity and steepness of the stream long profiles. Moreover, it located at high elevation relicts of an old landscape less rugged than the present one and originated several orders of fluvial terraces. Crustal tectonics dominated the hydrographic net organization and induced river captures in the axial sector of the chain. Filtering the topography at different wavelengths, we observed a relative depression in correspondence of the Carpathian curvature, where mantle seismicity data indicate a narrow but still active Wadati-Benioff zone. We think this feature supports the current idea that mantle flow dragged down by the subducting slab produces a (relatively) negative dynamic topography.