



Topographic metrics in the southern sector of the Marche foothills: implication for active tectonic analysis

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Quantitative geomorphic analysis can be provided a useful contribution to the study of recent tectonics. Some parameters, that quantify the channels morphology, as the Stream Length-Gradient (SL) Index (Hack, 1973) and the Steepness (Ks) Index (Flint, 1974), are generally used to detect anomalies on the expected concave-up equilibrium stream-profile, which can result in local abrupt changes in stream gradient (i.e. knickpoints) and/or broad convexities on stream long-profiles extending for tens of kilometres (i.e. knickzones).

The main goal of this work is the study of the morphological and morphometrical features in the southern sector of the Marche Region, with the aim to gain new knowledge on the influences of rock resistance and rock uplift on the fluvial and topographic system. The investigated area is situated in central Italy and it extends from the axial zone of the Umbria–Marche Apennines to the Adriatic Sea, including the southern sector of the Marche Region and belongs to the foredeep domain of the Apennines orogenic system, which has affected by tectonic activity up to very recent times. The rheology of outcropping deposits doesn't allow the strain to be easily recorded at the outcrop scale.

The analyses have been aimed at to test the sensitivity of both SL and Ks for evaluating active crustal deformations, acting at different wavelengths on land surface, within a low tectonically active thrust-and-fold belt. Additional purpose was the understanding of the pattern of regional differential crustal activity in the topographic arrangement of the study area. In this research project two sets of analysis were conducted.

References

Hack J.T. 1973. Stream-profile analysis and stream-gradient index. *Journal of Research of the U.S. Geological Survey*, 1, 421-429.

Flint J.J. 1974. Stream gradient as a function of order, magnitude and discharge. *Water Resources Research*, 10, 969-973.