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## TESTING THE GEOLOGICAL INFLUENCES ON THE EVOLUTION OF RIVER PROFILES: A CASE FROM THE NORTHERN APENNINES (ITALY)

**ABSTRACT:** SPAGNOLO M. & PAZZAGLIA F.J., *Testing the geological influences on the evolution of river profiles: a case from the northern Apennines (Italy)*. (IT ISSN 1724-4757, 2005).

Longitudinal river profiles of the Emilia and Romagna Apennines rivers were modeled using a slope-area and stream power law approach in order to verify the influence of variable rock types and hypothesized higher rates of rock uplift in the Romagna region. In particular, long river profiles were studied in terms of their concavity and steepness.

A sensitivity analysis using different methods of sampling a DEM and subsequent profile smoothing established the details of our methodology.

We find concavity and steepness both to be affected by the sampling method which subsequently guides our selection of 14 long trunk rivers and 15 small headwater channels distributed evenly between the Emilia and Romagna portions of the range. Modeled concavity and steepness values are largely consistent with those reported by similar studies and lie close to the stream power law predicted values for steady-state channels. Overall, profile concavity is higher in the Emilia portion, especially for the

small channels, with respect to the Romagna region. In both the main trunks and small channels analyses, steepness is also higher in the Emilia region. These results have three possible interpretations.

The rocks in the Emilia Apennines offer greater overall resistance to erosion than those in Romagna, although the traditional notion is that the siliciclastic turbidites of Romagna should be more durable than the Ligurian units of Emilia. Alternatively, rock uplift in Emilia is currently greater than in Romagna, but this observation stands in contrast to the fact that the Ligurian rocks are still intact as a structural lid in Emilia. Lastly, the results may be interpreted as sediment flux and comparative rate of down stream fining in the channels with the Emilia rivers characterized by coarser grain sizes, especially in the headwaters region. The last possibility makes a prediction about the variable hydrology of watersheds underlain by variable rock type that can be directly tested as a follow up to this study.

**KEY WORDS:** Fluvial geomorphology, Landscape evolution, Northern Apennines, Longitudinal river profiles, Slope vs. area analysis.

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