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MORPHOMETRIC EVIDENCE OF THE TOPOGRAPHIC GROWTH OF THE CENTRAL APENNINES

ABSTRACT: MOLIN P. & FUBELLI G., *Morphometric evidence of the topographic growth of the central Apennines*. (IT ISSN 1724-4757, 2005).

On the basis of DEM analysis, we examine the tectonic geomorphology of the Apennines in central Italy to figure out the topographic evidence for how Apennines landscape was shaped by its emergence above sea level, in the tectonic context of a growing mountain chain.

Geologic and geomorphic data suggest that its topographic growth was slow during the phase of crustal shortening (Miocene-Pliocene), but accelerated at the end of lower Pleistocene, when tectonics was already dominated by extension. Such different uplift rates should influence the development of the resulting landforms.

We investigate the topography and the drainage features of a E-W transect across central Italy, focusing on topographic metrics, drainage pattern and stream long profiles.

The results indicate that the Apennines topography is characterized by the superimposition of a short wavelength (10-30 km wide spacing), linked to local tectonic structures (extensional on the Tyrrhenian side and compressive on the Adriatic side), and a long one that corresponds to a broad topographic bulge 200-300 km wide, that records a regional uplift. As a response, the rivers incised the topography of the growing chain mostly the same and, interacting with climate changes, generated at least three major inset alluvial terraces. In particular, on the Tyrrhenian side, the rectangular drainage pattern indicates the strong influence of the extensional tectonics.

This is also evident in the stream long profiles, where knickpoints and knickzones correspond with tectonic lineaments and extensional basins respectively.

The hydrographic network draining to the Adriatic Sea shows a parallel pattern. The knickpoints of the stream long profiles generally correspond to rock changes and to very deep and narrow gorges, where the rivers incised the compressive structures reaching their cores. A high-resolution DEM of an area just south of Ancona provided information at a nested scale of observation.

This region contains two major low relief surfaces. The one at higher elevations is located at the crest of the chain cutting across carbonates and marls.

The other surface is inset into the flanks of the range and mostly cuts across turbidites. A third geomorphic surface, located more eastward, is underlain by Pliocene and Quaternary deposits. Coupling the morphometry analysis, the map of Pliocene-lower Pleistocene deposits, and previous studies, we explore the relationships among the landscape features, the regional vertical tectonism, and the local deformational processes.

The results are consistent with a landscape dominated by the broad Quaternary uplift superimposed on local tectonics, suggesting new constrains for the long term evolution of the landscape of central Italy in the context of the Apennines topographic growth.

KEY WORDS: Morphometry, Uplift, Central Apennines.

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