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An integrated approach based on subsurface structural data and on rivers morphological features to explain the mechanism of uplift and to evaluate the strain rates in the Abruzzi Peri-adriatic region (Italy)

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This study focuses on the late Pliocene-Quaternary evolution of the outer sector of the central Apennines and the adjacent Peri-adriatic basin in the Abruzzi region. In the inner sector of the analyzed area the Messinian-Pliocene siliciclastic deposits crop out close to the carbonate mountain front and they were involved by the Neogene compressive deformation; towards the east, the frontal compressive structures of the Apennine fold-and-thrust belt are buried underneath a thick late Pliocene-Early Pleistocene marine succession and only the uppermost portion of this section is exposed in outcrop. Alluvial terraced deposits (Middle Pleistocene-Holocene in age) unconformably overly the marine sediments and are found at different elevations with respect to the present-day rivers bed The general transition from marine to continental sedimentation and the presence of the older terraced alluvial deposits more than 100m above the present rivers, led many authors to consider a regional uplift during late Pliocene-Quaternary evolution of this sector. However, different and contrasting are the hypotheses formulated to explain the genesis and the modes of deformation of the Apenninic and Pedeappenninic regions and uncertain are the strain rates. Seismic reflection profiles interpretation allowed to characterize the structural setting of the buried Central Apennines thrust front and to define the activity of the compressive structures until the early Pleistocene; moreover, the analysis of the alluvial terraced deposits of the Pescara River provided additional constraints to unravel the late Pleistocene and Holocene evolution of the frontal sector of the Apennine chain. Digital Elevation models, cross-comparison between transversal and longitudinal rivers val-

ley profiles and analyses of the morphometric parameters were performed in order to better understand the modality of uplift and to evaluate the rates of incision/deposition in the catchment of the Pescara River during Quaternary times. The integration between the subsurface structural data and the geomorphological data provided significant information to evaluate strain rates and to explain the mechanism of deformation responsible for the Pliocene-Quaternary uplift recorded in the analysed area.