

The interaction between surface processes and tectonics during the late Quaternary in the Middle Volturno River valley (southern Italy): new morpho-stratigraphic constraints from fluvial terraces

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The Middle Volturno River valley is located in the inner part of the Southern Apennines of Italy, between the SW slope of the Matese Massif and the NE slopes of the Caserta mountains and is underlain by Meso-Cenozoic carbonate rocks and Miocene Flysch deposits.

The study sector includes the lower Calore River valley and, below the Calore-Volturno confluence, the valley portion that extends until the Triflisco gorge, from Telesse village to the Volturno dam. It is generally E-W, NW-SE and NE-SW elongated and characterized by rectilinear and meandering fluvial patterns.

The main infilling of the two valley portions is locally preserved as remnants of fluvial terraces hanging over the local base level up to ca. 30-40 m. It is generally interfingering with and covered by several generations of alluvial fan and travertine deposits.

New Ar/Ar datings on tephra layers interbedded in the oldest generations of the alluvial fan deposits and new U/Th datings on travertine deposits, allowed to constrain the main infilling to the late Middle and the early Upper Pleistocene. Both deposits are locally covered by the Campanian Ignimbrite Formation (CI, 39 ky BP) and are intersected by high-angle faults generated during extensional tectonic phases that affected this sector of the Apennine chain since the Middle Pleistocene.

Furthermore, the geomorphological analyses of aerial photos and topographic maps (1:5000 in scale) highlight the presence of a flight of fluvial terraces younger than the CI deposits that can be grouped into four orders. The stratigraphical data, based on field surveys and boreholes analyses, supported by new tephrostratigraphical constraints and literature data, allow to refer the older orders (I and II) to the late Upper Pleistocene. The III and IV orders, instead, can be referred to the early Holocene and historical times, respectively. These chronological constraints allow to hypothesize that the genesis of the I and II orders seem to be driven by late Quaternary tectonics, while climatic and land use changes played a key role for the formation of the younger orders.