# Title: Short- and long-term geomorphological evolution of the Apennine divide area between Irpinia and Sannio

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# Proposal:

# The geomorphological evolution of the landscape depends on the complex interaction between endogenous and exogenous processes that can act at different spatial and temporal scales. Added to these is the contribution of lithology which, by influencing the rates of erosional processes, can mask or preserve evidence of vertical movements. The complex interaction between these components can be seen in the Irpino-Sannita sector of the southern Apennines, whose morpho-evolutionary events have been conditioned both by the morphotectonic evolution of the chain and by the widespread presence of predominantly clayey lithotypes. The former has determined the presence of structurally controlled depocentres filled with Quaternary continental deposits, to which seismogenic structures are associated in the DISS database (ITIS006 Ufita Valley) and active and capable faults in the Ithaca database (faults 33400 - Ufita Valley and 33300 - Castelbaronia). The clay lithotypes determine the presence of extensive gravitational phenomena that can mask the surface effects of vertical movements linked to a tectonic component. Despite the considerable scientific interest of this sector of the chain, the studies conducted have been mainly directed at the study of single landslide phenomena (such as, for example, the Montaguto landslide). Few, on the other hand, are the studies that deal with the morphotectonic evolution of the continental depocentres and the Apennine watershed. The aim of this project is to make a useful contribution to the reconstruction of the morpho-evolutionary events in the Irpino-Sannita sector of the South Apennine orogen, the results of which can also provide useful data for spatial planning purposes.

# Research Program

# The research project envisages several phases of investigations that will allow a progressive deepening of the state of knowledge. A first phase of bibliographic research and collection of subsoil stratigraphic data (estimated duration 6 months) will be followed by a second phase aimed at reconstructing the geomorphological setting through the analysis of detailed topographic maps (scale 1:5000) and LiDAR data (estimated duration 6 months). The geomorphological analysis will be accompanied by field surveys aimed at reconstructing the surface morphostructural structure. This will be followed by a third analysis phase (estimated duration 12 months) focusing on the morphometric analysis of the topography and hydrographic network using GIS and Matlab software. In this phase it is also planned to carry out drone acquisitions in areas of extreme interest for the reconstruction of very high-resolution digital models (less than one meter). The data thus collected can be integrated with InSAR data for the reconstruction of recent vertical and horizontal deformations. It is also planned to carry out geophysical surveys where field and stratigraphic data do not allow a detailed reconstruction of the deep stratigraphic structure of the investigated depocentres (Grottaminarda basin, Ufita river basin). The last twelve months of research will be dedicated to synthesising the results collected in the previous two years and to writing the thesis. During the project, active collaboration is planned with colleagues from ISPRA who experts in the definition of the spatial and temporal distribution of gravity phenomena are, as well as with colleagues from CNR-ISPC in Tito Scalo (PZ) who are experts in the acquisition of very high-resolution digital terrain models and the estimation of erosion rates in low-order catchment areas.