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3D tectono-stratigraphic architecture and evolution of Plio-Pliestocene thrust-top basins of the southern Apennines: A case study from the Calvello Basin, Italy

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The Southern Apennines are a collisional fold-and-thrust system developed during the Neogene on an eastward-retreating, W-dipping subduction zone. In the southern sector, the structure of the Apenninic orogenic wedge configures as a thick thrust pile of heavily deformed rootless nappes, made of deep marine and carbonate platform, allochthonous units, tectonically overlying a buried deep-seated carbonate duplex system.
Thrust-top clastic successions of upper Eocene to Plio-Pleistocene age unconformably cover the entire thrust-pile, burying the older and deeper structures of the thrust system. Among these are several isolated thrust top basins whose position is transverse to the regional structural fabric of the southern Apennine system. These basins contain a deformed successions of marine to continental syn-tectonic sedimentary strata recording the spatial and temporal evolution of the southern Apennines, including the quaternary strike-slip and extensional tectonic phases.
Preliminary data from an interdisciplinary effort reveals 3D tectono-stratigraphic architecture evolution of the Calvello Basin. This study integrates diverse quantitative field data using UAV-based Structure from Motion Photogrammetry –enhanced field mapping at the basin and outcrop scale. This study is conducted with the specific goals of building 3-dimensional basin models of the Calvello Basin incorporating high-resolution stratigraphic and structural details to investigate the controls on their tectonic evolution and their sedimentary infill, as well as the present active tectonics. Data from this study provides a critical link between outcrop and seismic interpretations by bridging the gap between the thin-skinned structural elements seen in field observations of shallow geologic units and the deeper structural features. This analysis will allow us to improve the definitions of hydrocarbon traps present in the buried Apulian platform, and provide a better understanding of the active tectonics and geometry of the stress field affecting this portion of the southern Apennines.