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Combination of Earth Observation and Seismic Reflection Data Analysis for The Definition of Strike Slip Fault Zones in Central Crete

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The general understanding of the major tectonic structures that are traced on Crete Island is of great importance to decipher the geodynamic regime of the leading edge of the overriding Aegean microplate and consequently Eurasia's southernmost active margin. The aim of this multi-disciplinary methodology is to provide useful information for more reliable mapping of buried structures, which in turn supplement the dynamic and kinematic model of this key area of high interest.

Several indicators for the existence of oblique fault block displacement were identified with the use of earth observation data, as strike slip faulting expressions on the surface are more efficiently identified by vertical observations. Tectonic structures which are usually created along lateral displacements require different working scales. Hence, earth observation data (satellite images, aerial photographs) with various spatial characteristics need to be included.

Therefore, the methodology presented in this paper involves high spatial resolution digital elevation models and several remote sensing multispectral datasets, in many cases merged with higher spatial resolution panchromatic aerial photographs. The co-registration and ortho-rectification of all datasets proved to be a very significant part of this work in order to produce high resolution coloured 3D scenes at selected sites in central Crete, where the observed N-S trending strike slip fault zones crosscut arc parallel low angle normal faults and higher angle fault scarps.

Additionally, deep seismic reflection datasets along the major geomorphic structure of Messara basin were combined and highlighted the strike slip mechanism, since the continuation of the sub-vertical structures in depth has become clearer after the exact positioning of the sections and further interpretation.