

Geologic, Geomorphic and Geodetic Constraints on Vertical Motion Trends of Itea-Amfissa Basin (Northern Corinth Rift, Central Greece)

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Combining geological and geomorphological data together with geodetic SAR interferometry (InSAR) measurements an attempt has been made to investigate the vertical deformation of the Itea-Amfissa basin at the northern part of the Corinth rift. The north–south trending basin has been developed normally to the east – west trending Corinth Rift and on the hanging wall of the Itea-Amfissa detachment. In the stratigraphy of the Itea–Amfissa supra-detachment basin, two sequences can be distinguished; the lower marine polymict conglomerate of Early–Middle Miocene age and the upper terrestrial monomict carbonate breccia of Late Miocene age. The unconformity between them has been uplifted to the north of the basin up to the elevation of 1100m and subsided below sea level at its southern part. Remnants of low-relief surfaces are retained on top of the upper terrestrial sequence, that permit to reconstruct the paleo-landscape of the basin and to measure the spatial distribution of its vertical deformation after compensating the erosional isostatic adjustment. The exact delineation of the paleo-landscape, involved detailed mapping as well as quantitative analysis of geomorphological features caused by river incision, based on measurements of several tectonic geomorphology indices. Geodetic InSAR estimates of vertical ground displacements, combining almost 10 years of ascending and descending ENVISAT data, were also utilized both for refinement of delineated surfaces as well as for validation of geology-based deformation trends. Interferometric results were constrained to the geologic time frame, considering the well-defined long-term deformation trend of a doline, proven to be sinking over the last 6000 years. It is shown that over the last 10 years the largest uplift rates are observed within the Itea-Amfissa basin, while the coastline regions follow a more complex spatial deformation pattern of successive submergences and uplifts. The synthesis of geological and geomorphological data indicates that the Itea-Amfissa extensional basin from its development in the Middle-Late Miocene and throughout Plio-Quaternary, has been tilted towards south, while contemporary geodetic measurements from InSAR confirm that the basin is still uplifting with regard to its surrounding mountains and coastal areas.