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Fault slip-rates derived from modeling of on-shore marine terraces in the western Corinth Gulf

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Data available for estimating fault slip-rates from accurate modeling of uplifted on-shore marine terraces although limited are all derivatives of the research activity performed from 2004 to 2007 within the 3HAZ-Corinth project. We concentrated our efforts in the Aravonitsa area where we had a nicely preserved staircase of marine terraces.
In particular, we recognized and mapped in detail all the marine terraces by qualitative DEM analysis, airphoto interpretation and field survey and we adopted a forward modeling procedure to fit the data. The modeling approach we used in this work does not take into account any effect related to sedimentation, compaction and erosion nor any interseismic adjustment and thus, being purely based on coseismic deformation, the obtained results should be considered as maxima.
In the study area we were able to recognize several surfaces related to sea-level still stands. Their areal distribution and elevation are strongly influenced by past intense erosion on the underlying weakly consolidated sediments, and by the activity of secondary faults at the footwall of the Neos Erineos Fault, being part of the Lambiri - Neos Erineos - Aigion Fault zone (LANEfz). The Neos Erineos Fault has been studied and investigated in details and it appears as one of the main N-dipping normal faults bounding the southern shore of the Corinth Gulf and taking on part of the observed N-S striking extension.
U/Th-series age dates and nannoplankton analyses, performed on selected samples collected at different heights on the studied surfaces, allowed us to to reconstruct an almost complete and chronologically well constrained transect of uplifted marine terraces belonging to the Late Quaternary (as old as 350 ka).
A tentative correlation with marine isotopic stages (MIS) and specifically with main highstands from the Late Quaternary eustatic sea-level curve was attempted in order to calculate footwall uplift rate for the Neos Erineos Fault.
The calculated uplift rates, ranging from 1.2 to 1.6 mm/yr, are the result of both footwall uplift and regional uplift. The latter is still a matter of debate within the scientific community and it has been estimated to be in the order of about 0.2 mm/yr.
To translate the uplift rates obtained at different locations along the fault footwall to fault slip-rates we adopted a forward modeling procedure: our calculations assume uniform slip on planar rectangular faults embedded in an elastic half-space, and were performed with a code based on the standard dislocation theory. The resulting long-term slip-rates range from 6 to 9 mm/yr for the Neos Erineos Fault, and were obtained taking into consideration the 0.2 mm/yr regional uplift rate. These results are then compared with other modeling efforts done in the Corinth Rift both changing the rheological parameters and adopting a finite elements calculation.