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Faulting pattern and Paleostress Analysis on Symi Island (Dodecanese Islands, Greece)

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Results from detailed geological mapping and fault-slip paleostress analysis on Symi Island (Dodecanese, SE Aegean Sea, Greece) are presented. The Dodecanese bridge the area between the Lycian nappes (southwestern Turkey) and the Attic Cycladic Crystalline Complex (south-central Aegean), which is occupied by rocks that were exhumed from mid-crustal levels to near surface since the Oligo-Miocene, caused by the Hellenic trench retreat due to slab-rollback.
Symi Island, located at the central part of the Dodecanese, comprises Mesozoic sedimentary rocks that were affected by the Late Mesozoic – Early Cenozoic convergence between Eurasia and Gondwana. The main alpine deformation is represented by several ∼E-W to NE-SW thrust sheets, observed mainly at the northern and central part of the island. Successive faulting events that followed the alpine deformation created a complicate faulting pattern and effectively shaped the remarkable coastline, which is the most prominent geomorphological feature of the island. Based on detailed mapping and cross-cutting relationship the faulting pattern includes mainly two sets of faults: an older ∼NE-SW set that is dominant in the northern part of the island and a younger ∼E-W set that can be observed at the central and southern part.
We performed a paleostress analysis on an extended fault-slip data-set with the separation and stress inversion method TRM. According to the results two stress tensors have been derived, related to ∼NW-SE and ∼N-S extension, respectively. The ∼NW-SE is associated with the Late Miocene - Early Pliocene stress field while the ∼N-S coincides with the present-day stress field. According to the results, a clockwise gradual rotation of the trend of the least principal stress axis ($\sigma 3$) took place since the Late Miocene. This is most probably associated with regional events e.g., the accelerated retreat of the Hellenic subduction zone due to the escape of Anatolia towards the Aegean.