



Field evidence for a major normal fault on Kythnos Island (Western Cyclades, Greece)

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The island of Kythnos lies in the Western Cyclades, a group of islands south of Athens (Greece). The Cyclades islands are characterized by Miocene extensional tectonics overprinting earlier thrust and extrusion tectonics.

Recent geological and structural investigations on southwestern Kythnos have revealed a hitherto undescribed low-angle shear zone. A dominant feature of this large multi-phase SW-dipping normal fault is a several meters thick layer of ultra fine-grained marble ultramylonite, along with an up to half a meter thick ultracataclasite.

Shear sense indicators within the shear zone, predominantly *scc'*-fabrics and clast geometries, point to top to SW directed kinematics. The ultracataclastic layer represents the boundary between the marble and highly brecciated protocataclastic quartzitic rocks. Furthermore shallow layers of ultramylonitic marble and isolated lenses of Chl-schists can be found above the ultracataclasite. Directly beneath the cataclasites are ultramylonitic marbles which gradually progress into a mylonitic marble with Qtz-Fsp-rich layers.

Underlying the high-strain zone are gneisses, Chl-Ep-schists and mylonitic marbles intercalated with silicate-rich layers. Boudin-like lenses of metabasites and Grt-Gln-bearing gneisses, which are commonly enveloped in layers of talc-rich serpentinitic rocks, are present in the greenschist-facies footwall rocks. They point to an earlier stage of rock formation, but show similar kinematics.

The lithologies in the footwall are found to be dipping gently to the NNE, and with

progressing proximity to the high strain zone first shallowly and then more steeply to the SSW. Stretching and mineral lineations in all lithologies consistently trend in a SW-NE direction and SW-directed kinematics similar to the LANF can be observed. Furthermore the whole southern part of Kythnos mirrors a large antiform with a NE-SW dipping fold axis. This large dome shape is cut off abruptly by the LA shear zone.

The schists and marbles show intense ductile deformation, resulting in southwest-vergent isoclinal folding. Especially in the gneisses and mylonitic marbles large-scale isoclinal subhorizontal folding can be observed.

Along with results on major SW-directed low-angle normal faults on the neighboring islands of Kea and Serifos, the detailed analysis of the tectonic and kinematic history of the shear zone on Kythnos play a vital part in understanding the regional geodynamics.