



Pliocene-Pleistocene tectonics in the Dodecanese (W-Kos, Greece)

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The Dodecanese in the eastern Aegean region belong together with the Gulf of Corinth to the most seismically active and rapidly deforming part of Europe. These areas are known to show the highest present-day seismicity and the largest horizontal velocities (McClusky et al., 2000). Based on reconstruction of the 161 ka Kos Plateau Tuff (Smith et al., 1996) from reflection seismic profiles Pe-Piper et al. (2005) provided evidences for pre- to post-Late Pliocene faulting and tectonic subsidence. Faults defining the southeastern coastline of Kos and faults with major seabed offsets SW of Kos are seismically active and belong to a major ENE-trending system (Hatzfeld, 1999).

Using the Kos Plateau Tuff as a marker horizon, we extend these geophysical observations and provide new kinematic structural field investigations from Kos:

In W Kos (Kefalos) Upper Miocene/Pliocene lacustrine sandstones and conglomerates record tilting, bending and offset along roughly WSW-ENE trending high-angle normal faults indicating NNW-SSE extension. Partly the faulted sediments are unconformably overlain by graded sandstones and conglomerates. The Upper Miocene/Pliocene sediments are covered by the Pyroclastic Sequence of Kefalos and the Kos Plateau Tuff belonging to a Pliocene-Pleistocene rhyolitic volcanism. In central Kos fossil-rich Pleistocene marine sandstones recording W-E trending horst and graben structures with offsets in the order of ten meters are also covered by the Kos Plateau Tuff. These up to 30 – 40 m thick pyroclastic sediments are deformed by NW-SE striking conjugate zones of deformation bands recording normal and sinistral strike-slip motion. Zones with larger offset develop into faults with partly several centimeter-thick foliated clays. This fault system is used by the fluvial erosion forming

the incision of NW-SE striking valleys in the otherwise flat central Kos plateau. Interestingly the morphology of Kalymnos, an island 10 km north of Kos, is characterized by fault bounded NW-SE striking horst and graben structures. The youngest structures recorded in the Kos Plateau Tuff are W-E trending dilatation bands and opening mode-I fractures indicating N-S extension.

Concluding, zones of deformation bands and fault systems in the Pliocene-Pleistocene sediments in western Kos suggest an ongoing roughly N-S oriented extension. The Kos Plateau Tuff is furthermore characterized by major NW-SE trending faults with a sinistral strike-slip component influencing the morphology of the central part of Kos.

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