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Tectonic Crossroads: Evolving Orogens of Eurasia-Africa-Arabia

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BASIN SEDIMENTATION, NORMAL FAULTING AND LATE-STAGE EXHUMATION IN EXTERNAL HELLENIDES, SOUTH PELOPONNESUS, GREECE

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Results from mapping along a continuous transect across the southern Peloponnesus, Greece, suggest that records of extension and late-stage exhumation in south Peloponnesus contained within syntectonic sedimentary basin fills adjacent to large structural culminations. In the central and eastern sectors of the transect metamorphic rocks of the lower Phyllites-Quartzites and Plattenkalk Units form two mountain ranges, Mt Parnon eastwards and Mt Taygetos westwards, separated by a terrain lie at lower elevations. New data suggest a two-stage model for the extensional evolution of these sectors. Upper Miocene-Lower Pliocene extension was accommodated by several mappable brittle detachment faults that exhibit a top to the NE-ENE sense of shear on Mt Parnon and top to the SW-WSW on Mt Taygetos. The hanging-wall of the detachment comprises of non-metamorphic rocks of the Tripolitza and Pindos Units. This extensional stage resulted in little topographic expression. Since Upper Pliocene further exhumation of the metamorphic rocks has resulted in the formation of high-angle normal faults overprinting Neogene extensional structures and cut for first time the lowest Plattenkalk Unit. This new fault system tilted the earlier extensional structures and produced a ENE-WSW coaxial deformation. Syntectonic sedimentation within the newly formed Sparta and Vrontamas basins was mainly terrestrial. In Messenia Peninsula, the western sector of transect, Plio-Quaternary movement on NNW-SSE high-angle normal faults and ENE-WSW (to E-W) tranverse faults was superposed on an earlier Lower Miocene imbricate thrust stack as it documented by the fact that sedimentation of the West Hellenic Flysch continued into the Aquitanian. The thrust stuck comprises of the same non-metamorphic units that form the hanging-wall of the detachment faults on Mts Parnon and Taygetos. Marine sedimentation in this area was dominated by the interplay between tectonic uplift and global sea-level change. The central and western sectors are separated from Messenia Peninsula by a series of parallel foreland dipping high-angle normal faults form staircase geometry and control the Messenian half graben. Uplifted Late Pleistocene marine terraces on the footwall of these faults and recent seismic activity suggest that uplift of the internal sectors of transect is still active. Synextensional sedimentation within Sparta, Vrontamas and Messenia basins show that during the Lower to Middle Pleistocene a dramatic tectonic event took place when rapid uplift of the lowest Plattenklak Unit caused deposition within the adjacent basins of sediment-growth packages derived from metamorphic rocks of the mountain ranges. The entire tectonic evolution from the Late Miocene to recent times is mainly controlled by underplating prosecces due to the northward subduction beneath the Peloponnesus, which lead to gradual uplift of the deeper rocks, as new material is constantly accreted, while gravitational collapse occurs at the upper portions of the accretionary prism.

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General Information for this Meeting