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Late Cenozoic extensional faulting in Central-Western Peloponnesus, Greece

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A series of forearc-dipping, orogen-parallel extensional faults are found in the central-western Peloponnesus, (south-western Aegean) which control the western margin of Mt Mainalon. The latter comprises HP/LT rocks of the Phyllites-Quartzites Unit (PQ), overlain by the carbonates and flysch of the Tripolis Unit while the uppermost nappe is the Pindos Unit, a sequence of Mesozoic pelagic sequence, topped by a Paleocene flysch. Most of the extensional structures were previously thought of as the original thrust between the Pindos and Tripolis Units. However, the cross-cutting relationships among these structures indicate that these are forearc (SW-dipping) extensional faults, downthrowing the Pindos thrust by a few tens or hundreds of meters each, rooting onto different levels of the nappe pile. In SW Mainalon the lowermost of the extensional faults is a low-angle normal fault dipping SW juxtaposing the metamorphic rocks of the PQ Unit against the non-metamorphic sequence of the Tripolis Unit. High-angle normal faults, found further to the west, have truncated or even sole onto the low-angle ones and control the eastern margin of the Quaternary Megalopolis basin. All these extensional structures form the eastern boundary of a series of Neogene-Quaternary tectonic depressions, which in turn are separated by E-W horsts. In the NW, these faults are truncated by NE to NNE-striking, NW-dipping faults, which relay the whole fault activity to the eastern margin of the Pyrgos graben.
The whole extensional fault architecture has resulted (i) in the Pindos thrust stepping down from altitudes higher than 1000 m in Mainalon in the east, to negative heights in North Messinia and Southern Ilia in the west; and (ii) the gradual disappearance of the Phyllite-Quartzite metamorphics of Mainalon towards the west. The combination of these extensional faults (which may reach down to the Ionian décollement) with the low-angle floor thrusts of the Pindos, Tripolis and Ionian Units leads to additional ENE-WSW shortening, normal to the Hellenic Arc, west of the Peloponnesus.