Tracing marker horizons in the Serifos Island metamorphic core complex (Cyclades, Greece)

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Mapping metamorphic rocks in areas with complex tectonometamorphic history and multi-phase syn-metamorphic isoclinal folding, usually means not having safe stratigraphic evidence such as biomarkers or marker layers to make correlations between formations and units or to assign ages. Novel analytical techniques can be very useful but raise the cost and they do depend on meticulous field work. Therefore, traditional methods such as detailed geological mapping may be the only way to reach to valid correlations.

The Cycladic Islands in the Aegean domain is an area where rocks present a complex history of subduction, accretion and subsequent syn- and post-orogenic exhumation along crustal scale detachments. Fossils are very rarely preserved and lithologies are quite similar throughout the column. Serifos Island is the area where the top-to-S West Cycladic Detachment System (WCDS) was firstly identified and mapped in detail. The detachment is exposed at the northernmost (Platys Gialos) and the southernmost (Megalo Livadi, Cape Avessalos) part of the Island, having Cycladic Blueschist Unit rocks in the footwall and Upper Unit rocks in the hanging wall. The geometry of the fault resulted from late stage doming on the island scale.

At Platys Gialos, the structurally highest part of the WCDS footwall, a very distinct lithological sequence is observed exactly below the ultramylonitic marble of the Detachment zone. This sequence includes a marble metaconglomerate, which serves as the main index layer, blue-gray marble, schist, metaconglomerate and metabasite layers. Detailed mapping of the western part of Serifos in 1:5,000 scale, shows that this succession is traced all the way from Platys Gialos to Megalo Livadi. Also, it revealed meso- to macroscopic scale isoclinal refolding. The overall pattern proves the footwall has a periclinal geometry which follows the doming of the detachment.