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Further evidence for the Western Cycladic Detachment System on Makronisos, Greece

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The island of Makronisos lies ∼3 km east of the Attica port of Lavrion and is the northwesternmost part of the Western Cycladic archipelago. The geology of the Cyclades and the adjacent part of Attica is dominated by low-angle detachments caused by Miocene top-to-SSW crustal extension, forming the Western Cycladic Detachment System in this area. Although extension is well documented both in the other islands of the Western Cyclades and on the Attica mainland, the geology of Makronisos is very poorly known, due to its historical background, and is a "missing link" in the area. Thus the aim of the present study was to determine the tectonostratigraphic position of Makronisos in relation to the other Western Cycladic islands.

Most of Makronisos consists of schists interlayed with blue-grey (mylonitic) marbles, with quartzites forming large-scale pinch-and-swell structures. Metabasite outcrops are present as small bodies along the east side of the island and are massively developed in the southeast. All thin-sections made of metabasites, from the whole length of the island, contain blue amphiboles, although often only as relicts after retrogression. Serpentinite has been found at two localities. The tectonostratigraphically highest level of the island consists of white to pale-reddish ultramylonites, of up to ∼40 meter thickness. These are mainly located on the ridge of the island, but also, due to large-scale upright folding, along the coast. In several places, the ultramylonites overlie 1-2 metres of foliated ultracataclasites derived from the footwall pelitic schists. Stretching lineations and shear criteria indicate a top-to-SSW shear-sense. Microstructural analysis shows the same consistent shear-sense.

The available data suggest that Makronisos underwent a similar geological history as the Western Cyclades to the SW and that the detachment mapped is a component of the Western Cycladic Detachment System, with the white to pale-red ultramylonites forming the uppermost part of the footwall. We are conducting low-temperature thermochronology and expect late Miocene cooling ages preserved in the footwall assemblages, consistent with ages reported for Kea and on Attica.