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First palaeomagnetic results from the Mersin ophiolite (Turkey)

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The Mersin ophiolite of the central Taurides of Turkey formed by supra-subduction zone spreading within the northern Neotethyan ocean basin during the Late Cretaceous. No palaeomagnetic data currently exist for this ophiolite, and hence its relationship to other Neotethyan ophiolites that are known to have experienced tectonic rotation is currently unknown. Sampling of ultramafic and gabbroic cumulates took place along the Sorgun valley in the Mersin area. In addition, core samples were taken from the overlying Miocene carbonate sediments at a location to the south of the Sorgun valley.

Palaeomagnetic and anisotropy of magnetic susceptibility (AMS) results from 19 sites in Late Cretaceous lower crustal ultramafic and gabbroic cumulates and Miocene carbonate sediments are presented. Most of the samples from the extensive cumulate section showed clustering of Kmax axes parallel to the strike of layering, suggesting that the magnetic fabric has been affected by tectonic deformation. The gabbros showed a mixture of oblate and prolate magnetic fabric shapes. In general ultramafic cumulates showed more scattering in AMS, probably as a result of variable serpentinization of these rocks.

Stepwise thermal and alternating field demagnetization of cumulate samples showed high coercivity/high unblocking temperature components with a mean in situ direction of Dec = 053°, Inc = -25° and a tilt-corrected direction of Dec = 039°, Inc = 13°. In contrast, the samples from sub-horizontal Miocene carbonates showed low to intermediate coercivity/unblocking temperature components with a mean in situ direction of Dec = 341°, Inc = 58°. Together, these data suggest that the ophiolite was rotated clockwise by c. 60° prior to being covered by Miocene carbonate and then subsequently experienced c. 20° of anticlockwise rotation during regional neotectonic rotation of the Anatolian plate. The earlier clockwise rotation is potentially of composite origin (including components of intra-oceanic and emplacement-related rotations), and has a sense of rotation opposite to that seen in coeval ophiolites (Troodos, Hatay and Baer-Bassit) that formed in the southern Neotethyan basin.