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Episodic tectonic reactivation of S Neotethys in the E Mediterranean as evidenced from the Kyrenia (Girne) Range, Cyprus

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The Kyrenia (Girne) Range in the north of Cyprus is a several hundred kilometre-long, E-W-trending arcuate lineament that forms part of the S Neotethyan suture zone, extending into SE Turkey and Iran. The Range exemplifies multistage structural reactivation culminating in the present distinctive morphology. Beginning with a Mesozoic rifted passive margin, five main stages of tectonic reactivation are recognised. 1. Late Cretaceous subduction/metamorphism/exhumation/arc magmatism; 2. Palaeogene extension/transtension/intraplate magmatism; 3. Mid-Eocene accretion/thrusting/early collision, 4. Late Miocene thrusting/collision, and 5 Plio-Quaternary uplift (strike-slip/suture tightening/uplift).

Following regional Triassic rifting a carbonate platform developed during Jurassic-Cretaceous time, followed by its regional burial, deformation and greenschist facies metamorphism. The platform exhumed by Late Maastrichtian and was unconformably covered by locally derived carbonate breccias, passing upwards into Late Maastrichtian pelagic carbonates. Pelagic carbonates are interbedded with sandstone turbidites derived from mixed continental, basic volcanic, neritic carbonate and pelagic lithologies. Two contrasting volcanogenic sequences are exposed in the west, separated by a low-angle tectonic contact. The first is Campanian-Early Maastrichtian(?) pelagic carbonates, silicic tuffs, silicic lava debris flows and thick-bedded to massive rhyolitic lava flows. The second comprises two intervals of basaltic extrusive rocks interbedded with pelagic carbonates. Basaltic lavas throughout the Range are dated as Late Maastrichtian and Late Paleocene-Middle Eocene using planktic foraminifera (Robertson and Taslı, in press). Volcanism and pelagic carbonate deposition culminated in the emplacement of mega-debris flows (olistostromes) and southward thrusting during Mid-Eocene.

Upper Eocene-Upper Miocene mainly clastic sedimentary sequences are exposed on both flanks of the Range. A revised stratigraphy has been developed based on nannofossils, planktic foraminifera and Sr isotope dating (McCay et al., in prep). Ten formations are exposed to the north of a regionally important, E-W-trending, syn-sedimentary fault (Diğirmenlik (Kythrea) Fault) that divides the overall succession into northerly and southerly sub-basins. To the north of the fault, above basal conglomerates, a fining-upward siliciclastic turbidite sequence (Late Oligocene) then passes into biogenic calciturbidites and marls (Aquitanian-Langhian). During the Mid to Late Miocene the northerly sub-basin was characterised by thin-, to medium-bedded, calciturbidites and marls (Serravallian), overlain by thick-bedded, medium-grained lithic sandstones (Tortonian). The succession south of the syn-sedimentary fault is dominated by siliciclastic turbidites (Burdigalian-Tortonian). Palaeocurrent evidence shows mainly east-to-west flow especially during the Late Miocene (McCay and Robertson, under review).

Related to northward subduction of the S Neotethys, the Kyrenia platform is inferred to have underthrust a larger Tauride microcontinental unit to the north during Late Cretaceous and then rapidly exhumed prior to Late Maastrichtian. Pelagic carbonates and sandstone turbidites of mixed, largely continental provenance then accumulated along a deeply submerged continental borderland during Late Maastrichtian time. The Campanian-Early Maastrichtian (?) silicic volcanism reflects continental margin-type arc magmatism. In contrast, the Late Maastrichtian and Paleocene-M. Eocene basaltic volcanics erupted in an extensional (or transtensional) setting, likely to relate to anticlockwise rotation of the Troodos microplate. The Kyrenia Range next underwent southward thrusting and imbrication during Mid Eocene time coupled with shedding of mega-debris flows (olistostromes) into a trench or foredeep to the south. The basal conglomerates of the Late Eocene-Miocene sequence were derived relatively locally, whereas the overlying Miocene siliciclastic turbidites appear to have been mainly sourced from the Tauride Mountains, northeast of Cyprus, in response to diachronous northward subduction and collision further east. The Girne (Kyrenia) Range was emplaced over and imbricated with pre-existing units during Late Miocene-earliest Pliocene time in response to regional collision. Shallow marine transgression ensued

during Early-Mid Pliocene, followed by intense uplift of the elongate Range during Late Pliocene-Pleistocene time, possibly driven by collision of the Cyprus with the Eratosthenes Seamount to the south.