

The Troodos Ophiolite was probably formed at a RTT/RTF triple junction

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Many ophiolites such as the Troodos Ophiolite of Cyprus apparently formed in a 'supra-subduction zone' environment, but the exact tectonic setting is debated. We measured major and trace element abundances in Troodos volcanic glasses, using microanalytical techniques to avoid the effects of alteration. Basaltic, andesitic and dacitic glasses from a section through the lava pile at Akaki Canyon are tholeiitic, and have a range in incompatible trace element composition. At one extreme are lavas with typical back-arc spreading centre-like chemistry; small enrichments in fluid-mobile Ba, U, Pb, Rb relative to fluid-immobile elements of similar compatibility, and REE and HFSE ratios that are similar to mid-ocean ridge basalts. Other Akaki lavas have trace element compositions extending towards those of Troodos boninites, with highly depleted REE ratios, strong enrichments in fluid-soluble elements, but also relatively high Nb and Ta. Troodos lavas formed by decompression melting of upper mantle which was depleted by previous melting events, and enriched by fluids (Pb, U, Ba, Rb) and small degree melts (Nb, Ta).

The geochemical characteristics of these lavas, and the absence of an overlying mature arc can be explained if the Troodos crust formed at a spreading centre close to a ridge-trench-trench or ridge-trench-transform triple junction, where subduction-modified, volatile-rich, highly depleted mantle was able to upwell and melt at shallow depths. Troodos crust was thus formed by both fluxing and stretching. At such triple junctions, arc magmatism is captured by the ridge, explaining the lack of an arc sequence in Troodos. The spreading centre, located on the over-riding plate, creates subduction-related tholeiitic to boninitic oceanic crust in a 'fore-arc' location. Once transported off-axis, this crust may become basement for the adjacent arc <5 Ma later. This tectonic setting therefore provides a way to create fore-arc crust with its distinctive assemblage of rocktypes, which is only slightly older than the overlying arc, without invoking subduction initiation [1] [2].

[1] J. Casey, J. Dewey. AGU Fall Meeting (2014) V51F-02.

[2] M. Regelous *et al* *Chem. Geol.* **386** (2014) 66-79.