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Nature of the Akamas ophiolite, W Cyprus

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Cyprus has been an ideal place to study the evolution of oceanic lithosphere. The complete preservation of the ophiolite in the Troodos Complex has allowed better understanding on the ocean closure process and the emplacement of oceanic lithospheric fragments on land. These previous studies have put the development of plate tectonic theory a great leap forward. Compared to the famous Troodos ophiolite, the ophiolitic suite lying on Akamas Peninsula at the western end of the island has received far less attention. Different from the updomed Troodos ophiolite, the Akamas ophiolite formed a linear NNW-SSE ridge in Akamas Peninsula, and it was isolated from the Troodos ophiolite by the Polis Graben and Mamonia Complex. The ultramafic section made up the backbone of the ridge. It was composed of intensively serpentinized harzburgite and dunite with extensive magnesite deposit associated. Brecciation and multiphase shears were observed within the ophiolite. The Sheeted Dyke Complex (SDC) and lava sequences were underthrust on the western flank of the ridge. The SDC were generally striking parallel to the orientation of the ridge and dipping east, while the lavas were usually rotated or even overturned. All these observations showed that the Akamas ophiolite was severely tectonized after its formation.

The Akamas ophiolite has been regarded as part of the Troodos Complex. Since the 1960s, extensive volcanic geochemical data of the Troodos Complex have been collected for tectonic modelling. As part of the Complex, several Akamas lava samples were also included in these researches. They have shown a geochemical affinity with the Arakapas-type lavas, which were commonly found in the Southern Troodos Transform Fault Zone (STTFZ). However, the result did not lead to any further study on the emplacement of this isolated ophiolitic suite. In this project, over 40 lava and diabase dyke samples have been collected from the Akamas ophiolite. Their major and trace element content were analyzed and compared with the Troodos lavas. The results were consistent with the previous studies, hinting that the ophiolite is closely related with the STTFZ. However, the trend of the SDC in the Akamas ophiolite was nearly perpendicular to that observed in the STTFZ. By tracing the volcanics with similar geochemical affinity, it was found that the transform may have been swung from E-W in Limassol Forest to NNW near Akamas Peninsula. It had branched off into an array of transform fault system in the western extension. The Akamas ophiolite could be emplaced through the activation of this system. Another evidence came from the deposition of the Kannaviou Formation in the area, which sits on the Akamas lavas and brecciated serpentinite within a graben structure. Similar setting were also found in Kannaviou and Agia Varvara, where the Arakapas-type lavas were also found. The association of magnesite within the Akamas serpentinites has showed a carbonate origin from the Mamonia Complex through carbon isotopic analysis. With the help of existing paleomagnetic data, emplacement model for the Akamas ophiolite was provided, relating the paleorotation of the Troodos Microplate and the juxtaposition of the Mamonia Complex.