
Unravelling the sources of the thick Miocene pyroclastic flows, Kos (Greece)

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Kos is one of several localities (Samos, Patmos, Bodrum) in the southeast Aegean Sea with Upper Miocene volcanic rocks. The stratigraphic succession of flows, ignimbrites and interbedded sediments were studied in the field in order to better understand the age, distribution, source and tectonic setting of Upper Miocene volcanic rocks of Kos. Previous radiometric dating shows that the age of the volcanism is about 10 Ma.

In northern Kos, thin andesite flows and dacite domes are overlain by thin pyroclastic rocks near Profitis Ilias and at Tripa; north of Ag. Fokas, a thin pyroclastic succession includes lahars. In southern Kos, pyroclastic successions totalling 80 m in thickness are interbedded with Miocene clastic sediments and marls at Ag. Fokas and Ag. Stefanos.

At Ag. Stefanos, the lowest volcanic rocks are volcanoclastic conglomerates deposited from channelised hyperconcentrated flows, overlain by an ignimbrite rich in limestone clasts. This is overlain by 50–60 m of marls and clastic sediments, a 10–20 m thick ignimbrite succession, a further 80 m of marls and clastic sediments, and finally 60 m of ignimbrite, possibly in three major eruptive cycles with upward increase in abundance and size of lithic clasts. At Ag. Fokas, 80 m of ignimbrites overlie thin airfall tuff over marls and are interrupted by two thin intervals of sediment, one marl and the other sandstone. In both localities, interbedded sediments appear to be of fluvial or lacustrine origin.

Paleocurrent indicators in ignimbrites suggest that the Ag. Stefanos section was derived from a source to the southeast and Ag. Fokas from a source to the south, most probably from a Miocene precursor of the modern volcanic centre of Nisyros–Yali. Lithic clasts in the ignimbrites were divided into groups on the basis of petrography and geochemistry, to attempt correlations between Ag. Stefanos and Ag. Fokas and to assess their affinity to the minor andesite-dacite volcanism at Prof. Ilias and Tripa. Preliminary results suggest correlations between the upper Ag. Stefanos ignimbrite and that at Ag. Fokas north. Other ignimbrites appear to be petrographically distinct. Clasts similar to lavas at Prof. Ilias are common in several ignimbrites.

Upper Miocene volcanism was synchronous with emplacement of the Dikeos monzonite during E-W strike-slip faulting. This faulting created local transtensional or transpressional de-

formation, leading to uplift and unroofing of the monzonite, the overthrusting emplacement of alpine basement onto the monzonite, and creation of the Late Miocene basins in which thick successions of ignimbrite were deposited subaerially or in shallow lakes. The flows at Prof. Ilias and Tripa may be related to the faulted northern margin of a southern Kos basin within which the thick ignimbrites accumulated. The thickest ignimbrites were derived from a stratovolcano located near the present island of Nisyros.