



The advance of Kos Plateau Tuff ignimbrite into the marine realm of the Kalymnos Basin, SE Aegean Sea.

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The 161 ka Kos Plateau Tuff (KPT) eruption is considered to be the largest explosive Quaternary event in the eastern Mediterranean. It produced pumice rafts followed by “non-welded ignimbrites” that are up to 30m thick, especially widespread on Kos island and covering an area of > 80 Km² that includes mainly islands and present marine regions. Pyroclastic flows travelled from the proposed vent, that lies between and around Yali and Nisyros islands, across present land and sea, the total volume of the tuff has been estimated as at least 100km³. KPT products principally consist of rhyolitic ash and pumice.

Post 2010 Athens University oceanographic missions have mapped the seafloor around the volcanic islands of the SE Aegean Sea. Here we present new data on seafloor morphology and Upper Quaternary seafloor stratigraphy of the Kalymnos basin that extends over an area over 70km² and map the advance and deposition of the KPT that was previously unknown in this region.

The Kalymnos basin is roughly triangular in shape and essentially consists of two sedimentation depocenters: a) a roughly elliptical 400 m deep northern segment that is developed sub-parallel to Kalymnos Island and its W-SW shelf; b) a rather physiographically complex western sector developed NE of Astipalea island and reaching depths of over 620m. High resolution sparker profiles from the west Kos-Kalymnos shelf reveal an outstanding seismic stratigraphy of stacked and prograded coastal clinoform packets capped by erosional transgressive surfaces that record Quaternary eustatic lowstands deposits of sea level with clinoforms developing during forced regression and the erosional surfaces during transgression. We show that a massive gravity flow deposit is intercalated with the shelf sediments. Above it low sea level MIS 6 and 2 sedimentary sequences are fully developed and below stage 8-10 sediments are erratically preserved over stages 12 and 16 sediments. This gravity flow deposit swept across the shelf and slope off NW Kos and Kalymnos islands moving downslope into the basin, eroding the sea floor and depositing a giant massive bed. The flow climbed upwards on the surrounding basin slopes. The acoustically incoherent character of this deposit, characteristic of massive flow deposits lacking well-defined stratification, shows maximum thickness of over 100m (roughly 80m) in the eastern sector of the basin, WNW of the Kos-Kalymnos shelf. Where the deposit is thicker, numerous diapirs rise to the sea bottom from the gravity flow deposit. In the western deeper sector of the basin the deposit is generally thinner, around 25m (about 20m) thick and generally thins towards the NW edge of the basin.

Cores recovered within the basin did not penetrate down to this deposit. However sedimentation rates fully support the correlation of this massive deposit to KPT. Furthermore seismic stratigraphy provides univocal evidence that this highly erosive bed, below isotopic stage 6, correlates to the KPT. This deposit may be a result of similar flow processes to those recognized in the northern Cretan Basin south of Santorini, but the presence of the diapirs in the Kalymnos basin suggests an unusually mobile seafloor deposit.