3-D VELOCITY ANOMALIES INVESTIGATION OF THE SANTORINI ISLAND VOLCANIC COMPLEX

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The present study is focused in the recently activated area of Southern Aegean Sea, which comprises of the Santorini Island Volcanic Complex (SVC) and the region south-west of it. Two main spatiotemporal clusters have been identified in SVC, one near the north-eastern edge of the Santorini Island, close to the Columbo Reef, which has been recorded by the SANNET-2003 local network (March 2003-August 2003) and the other inside the Caldera (2011-2012), recorded by the local stations of the Hellenic Unified Seismological Network (HUSN). The latter clustered earthquake activity has significantly increased during autumn 2011, possibly attributed to the augmentation of fluid flow inside local fracture zones.

The LOTOS algorithm was applied in order to perform an iterative tomographic inversion for 3-D seismic V_P, V_S and V_P/V_S ratio using travel-times of local earthquakes recorded by the two networks described above. More than 1000 seismic events have been selected for the inversion with specific criteria of spatiotemporal errors and geographic distribution in order to provide the greatest possible resolution. The obtained outcome confirms the existence of strong variations of V_P and V_S structure in the area of the SVC, as well as a connection between the volcano-tectonic processes taking place beneath this Complex and Columbo volcano. The resulting tomographic models reveal a discontinuity between a low and a high velocity zone along the NE edge of the Santorini Island, parallel to the Kameni-Columbo line. Furthermore, the possible existence of a magmatic chamber is indicated by low V_P, V_S and high V_P/V_S ratio areas inside the caldera. Furthermore, the tomographic results are in agreement with recent GPS and geochemical studies in this area.