



Investigating the active hydrothermal field of Kolumbo Volcano using CTD profiling

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The submarine Kolumbo volcano NE of Santorini Island and the unique active hydrothermal vent field on its crater field (depth ~ 500 m) have been recently explored in multiple cruises aboard E/V Nautilus. ROV explorations showed the existence of extensive vent activity and almost completely absence of vent-specific macrofauna. Gas discharges have been found to be 99%-rich in CO_2 , which is sequestered at the bottom of the crater due to a special combination of physicochemical and geomorphological factors.

The dynamic conditions existing along the water column in the crater have been studied in detail by means of temperature, salinity and conductivity depth profiles for the first time. CTD sensors aboard the ROV Hercules were employed to record anomalies in those parameters in an attempt to investigate several active and inactive vent locations. Temporal CTD monitoring inside and outside of the crater was carried out over a period of two years. Direct comparison between the vent field and locations outside the main cone, where no hydrothermal activity is known to exist, showed completely different characteristics. CTD profiles above the active vent field (NNE side) are correlated to Kolumbo's cone morphology. The profiles suggest the existence of four distinct zones of physicochemical properties in the water column. The layer directly above the chimneys exhibit gas discharges highly enriched in CO_2 . Continuous gas motoring is essential to identify the onset of geological hazards in the region.