Theme: 3. Volcanic processes

Session 3.8: Hydrothermal alteration in volcanic systems

Allocated presentation: Talk

Continuous subaerial mapping of hydrothermal outflow in Milos: the new view from visible and infrared drone imaging.

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Milos is an island of the Aegean volcanic arc developed during plio-quaternary transtensive tectonics. The island displays ground deformation, seismic activity, historical phreatic explosions and is the most important high-enthalpy geothermal field in Greece (Liakopoulos 1987; Fytikas 1989). The area contains indications of hydrothermal activity, including gas and liquid emissions (onshore: altered soils, local mineralization, hot soils and fumarolic vents; offshore: bubbling vents, bacterial mats and precipitates). To characterize the subaerial and underwater near-shore hydrothermal circulations in space we conducted an extensive aerial drone survey from Kalamos headland to Agia Kyriaki and Psaravolada bays, acquiring visible and infrared (IR) photomosaics. Regional qualitative T°C maps were obtained, corrected using landmarks of known emissivity. IR images highlight the morphologies of T°C anomalies, that correspond to diffuse, localized, elongated, circular zones of activity, and that have been correlated with geological features (e.g. fault-zone, fault-rocks, fractures, silification and argilitization). At the metric-scale, we document both local T°C gradients and highly localized T°C anomalies . At regional-scale, thermal anomalies generally strike either N-S (Zephyria graben orientation) or NW-SE until the Agia Kyriaki bay (Fyriplaka graben orientation). NE-SW orientations are also visible (Main Cycladic Lineament, see Cavailhes et al., 2025). Our modern, multi-scale, multi-methods and integrated mapping defines an heterogeneous regional thermal scheme which is tectonically-controlled, i.e. where preferential hydrothermal pathways and zones of potential hydrothermal fluid accumulation have been characterized. References -Cavailhes et al., 2025 “IAVCEI25-abstract” -Fytikas 1989, doi:10.1016/0375-6505(89)90060-6 -Liakopoulos 1987, Univ.-Paris-6 Thesis Researchgate.net -weblink