Theme: 3. Volcanic processes

Session 3.8: Hydrothermal alteration in volcanic systems

Allocated presentation: Poster

On the historical phreatic eruptions of Milos (Greece): an intertwined seismic/volcanic hazard?

Thibault Cavailhes[1], Jean-Emmanuel Martelat*[2], Philippe Grandjean[2], Sylvain Augier[2], Sophie Passot[2], Pascal Allemand[2], Escartín Javier[3], Nomikou Paraskevi[4], Konstantina Bejelou[4]

[1]EPOC, Université de Bordeaux, UMR CNRS 5805, Pessac, France; [2]Laboratoire de Géologie de Lyon (LGLTPE), Université de Lyon 1, ENSL, UMR CNRS 5276, Villeurbanne France; [3]Laboratoire de Géologie, Ecole Normale Supérieure, PSL Research University, UMR CNRS 8538, Paris, France; [4]Department of Geology and Geoenvironment, National and Kapodistrian University of Athens, Athens, Greece

*jean-emmanuel.martelat@univ-lyon1.fr

This work describes the Thiorichio phreatic crater field (Milos, Greece), located in a horst-type structural high (alt. ≃200 m) of a volcanic arc island. These craters, which cover an area of 1 to 2 km^2, are 15 to 20 m in diameter, 3 to 4 m deep and coalescing, suggesting successive local phreatic eruptions over a short period of time (Fontaine et al., 2003; Chiodini et al., 2023). The NW-SE strike of the field (*i.e.* sub-parallel to the Fyriplaka graben) ends south of Thiorichia (old sulphur mines) where the occurrence of these craters suggests genetic links with active tectonics, offshore hydrothermal seeps, and landslides. Using structural and sedimentary field observations, a regional topographic survey and drone photomosaics, we show that groups of 5 to 10 craters line up along several directions (NE-SW, N-S and NW-SE). The age of the eruptive craters is confirmed by pottery of probable Hellenistic age (≃2300 y B.P.) found into the phreatic cones. The potteries present in coarse volcaniclastics are draped under several centimetre-thick layers of volcanic ash. In terms of geological hazards, these observations lead us to (i) reconsider the source areas of the phreatic eruptions that probably led to the destruction of Aghia-Kyriaki (*e.g.* Traineau and Dalabakis, 1989; Photos-Jones et al., 1999) and (ii) support that the occurrence of a large earthquake (Mw > 5) on Milos could rupture the hydrothermally self-sealed cap system of fractures, depressurizes and chaotically drains the fluids (water, gases) probably trapped at the hypocenters of the underlying earthquakes.