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# FLUID SOURCES AND PATHWAYS IN DETACHMENTS ALONG MCC EXHUMATION: BARITE ISOTOPY AND FLUID SALINITY IN MYKONOS AND SERIFOS - CYCLADES, GREECE

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Extension in the Aegean back-arc region is controlled by subduction and mantle dynamics underneath. Slab retreat, since more than 30 Ma, has induced the formation of shallow-dipping crustal-scale detachments allowing the exhumation of metamorphic core complexes (MCC). These MCC are often associated with magmatic intrusions linked to mineralized systems and ore deposits. Indeed, detachments and associated steeper faults are favourable sites for fluid circulation. Therefore, they are of major interest in understanding the development of geothermal systems and associated ore deposits and metallogenic provinces.

The Miocene MCCs of Mykonos and Serifos are two key examples of the complexity of these systems. Both were emplaced below two of the main Aegean detachments, associated with Miocene granitic intrusions. Deformation along the two detachments shows an evolution from ductile to brittle. The geometry of both detachment systems stems from the in-sequence activation of several individual detachments before, during, and after the intrusions. Fluid circulation along the detachments and leaching of granites and/or migmatites resulted in skarns and iron-barite mineralization. However, Mykonos and Serifos differ in the expression of their mineralization, with large barite-iron deposits and few skarns in Mykonos, and little barite but several large skarn deposits in Serifos. They also differ by the presence (Mykonos) or absence (Serifos) of a supra-detachment basin. Despite a common geodynamic environment, these differences raise questions about the fluid sources and pathways in geothermal systems.

This work proposes a field study coupled to geochemical approaches: Raman spectroscopy on primary fluid inclusions to obtain salinity and gas content in barite and skarns, as well as S and O isotopic analyses in barite. Fluid inclusions in barite show a bimodal distribution with low (seawater signature) and high salinities. In skarns, salinities up to 40 wt% NaCl are measured in Serifos and lower salinities in Mykonos. Sulfur isotopic signatures are close to seawater for Mykonos but suggest a mixed seawater-magmatic source for Serifos. Salinities and isotopic signatures allow us to source these highly salted fluids: the signature of Serifos is closer to magmatic fluids while Mykonos fluids are rather buffered by seawater.