The hydrothermal system of the Miocene volcanic rocks of western Lesbos, Greece

ALEXIS IMPERIAL, GEORGIA PE-PIPER, AND DAVID J.W. PIPER

Department of Geology, Saint Mary's University, Halifax, Nova Scotia, B3H 3C3

The Sigri Pyroclastic Formation in the western side of the island of Lesbos consists primarily of pumice flows, mudflows, and stream conglomerate. Most of the pyroclastic rocks appear to be derived from a caldera near Vatoussa and shows extensive alteration and mineralization. The purpose of this study is to understand the hydrothermal fluid(s) altering the volcanic rocks and to determine a model for the hydrothermal system. Samples were collected from the Jithra ignimbrite, layered fine-grained sediments underlying the ignimbrite, a zoned nodule at a fault zone, and a wood sample from the Sigri Petrified Forest. Rock mineralogy and chemistry were investigated using a petrographic microscope, scanning electron microscope, electron microprobe, and Laser Raman spectroscopy. Hydrothermal alteration minerals and assemblages identified from the altered ignimbrite are: (1) K-feldspar +silica +illite +minor apatite, zircon, TiO_2 minerals; (2) Jarosite +hematite +amorphous silica; and (3) Mn-oxides. Three different horizons from the underlying sediments shows identical mineral assemblage of smectite +silica +TiO_2 minerals ±monazite±hematite. The presence of hydrothermal quartz, K-feldspar, kaolinite and smectite are closely similar to the alteration assemblages in the epithermal system of the Taupo volcanic zone which were formed by different types of circulating groundwater. Hydrothermal veins and the zoned nodule are predominantly made up silica-ironmanganese mineralization. The availability of manganese may be related to the decay of organic matter as the study area used to be forested with multiple tree horizons, although the amorphous silica-iron mineralization is mineralogically and chemically comparable to jaspers found in exhalative marine systems. This observation is intriguing because there is no evidence for a nearby marine condition in western Lesbos. [Poster]

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