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The Stypsi-Megala Therma porphyry-epithermal mineralization, Lesvos Island, Greece: new mineralogical and geochemical data

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Lesvos Island is located at the NE part of the Aegean Sea and mostly comprises post-collisional Miocene volcanic rocks of shoshonitic to calc-alkaline geochemical affinities. In the northern part of the Island, the Stypsi Cu-Mo±Au porphyry prospect, part of the Stypsi caldera, is hosted within hydrothermally altered intrusives and volcanics [1]. Porphyry-style mineralization is developed in a microgranite porphyry that has intruded basaltic trachyandesitic lavas. Propylitic alteration occurs distal to the mineralization, whereas sodic-calcic alteration related to quartz-actinolite veinlets, and a phyllic overprint associated with a dense stockwork of banded black quartz±carbonate veinlets, characterizes the core of the system. Alunite-kaolinite advanced argillic alteration occurs at higher topographic levels and represents a barren lithocap to the porphyry mineralization. Intermediate-sulfidation (IS) milky quartz-carbonate veins overprint the porphyry mineralization along a NNE-trending fault that extends further northwards to Megala Therma, where it hosts IS base metal-rich Ag-Au mineralization [2]. New mineralogical data from the Megala Therma deposit suggest Ag-famatinite, Te-polybasite and Ag-tetrahedrite as the main carriers of Ag in the mineralization. Porphyry-style ores at Stypsi consist of magnetite postdated by pyrite and then by chalcopyrite, molybdenite, sphalerite, galena and bismuthinite within the black quartz stockworks or disseminated in the wallrock [1]. The dark coloration of quartz in the veinlets is due to abundant vapor-rich fluid inclusions. Quartz is granular and fine-grained and locally elongated perpendicular to the vein walls. Botryoidal textures are continuous through quartz grains, suggesting quartz recrystallization from a silica gel, a feature already described by [3] from banded quartz veinlets in porphyry Au deposits at Maricunga, Chile. Bulk ore analyses from porphyry-style mineralization at Stypsi displayed similar geochemical anomalies to those previously reported by [1] but also provide additional information in a series of elements: Cu (up to 843 ppm), Mo (up to 76 ppm), Au (up to 120 ppb), Pb (up to 339ppm), Zn (up to 815ppm), Se (up to 10ppm), Te (up to 4 ppm), Bi (up to 4 ppm) and Sn (up to 23 ppm). The Lesvos Island may be interpreted as the westward extension of the Eocene-Miocene Biga peninsula Cu-Au porphyry belt, with potential for future discoveries of Cu-Mo±Au deposits in the Aegean area.

[1] Voudouris P, Alfieris D (2005) New porphyry-Cu±Mo occurrences in northeastern Aegean/Greece: Ore mineralogy and transition to epithermal environment. In: Mao J, Bierlein FP (eds) Mineral deposit research: Meeting the global challenge. Springer Verlag, 473-476; [2] Kontis E, Kelepertsis AE, Skounakis S (1994) Geochemistry and alteration facies associated with epithermal precious metal mineralization in an active geothermal system, northern Lesvos, Greece. Min Deposita, 29:430-433; [3] Muntean JL, Einaudi MT (2000) Porphyry Gold Deposits of the Refugio District, Maricunga Belt, Northern Chile. Econ. Geology, 95, 1445–1472.