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## A New Discovery in Biga Peninsula: Geologic, Mineralogical-Petrographic, and Fluid Inclusion Characteristics of Çatalçam (Soma-Manisa) Au-Pb-Zn-Cu Mineralization

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Biga Peninsula, located in the NW Turkey and one of the main porphyry and epithermal mineralization belts, recorded multiphase deformation and magmatism events caused by successive opening and closing of the Paleo- and Neotethys oceans. Following the closure of the Neotethyan Ocean, Eocene-aged arc-related magmatism developed and continued until the Lower Miocene. The arc-related magmatism in the region is the source of porphyry and epithermal-ype polymetallic mineralizations.

In the south of Biga Peninsula, within the scope of the exploration project actively conducted by MTA, a diorite porphyry intrusion (Çatalçam Intrusion) that cuts the Lower and Middle Miocene-aged volcanic rocks was mapped for the first time, and Au-Pb-Zn-Cu mineralization, which is thought to have developed related to this intrusion, was discovered. Crosscutting and/or telescopic potassic (magnetite, biotite, undulated quartz), phyllic (sericite, quartz), and argillic (kaolinite, barite, quartz, and calcite) alteration zones are developed in porphyry body and host volcanic rocks. Stockwork vein-veinlets containing pyrite, chalcopyrite, sphalerite, and galena, as well as gold, have formed in the Çatalçam Intrusion and host rocks. While A-type quartz vein-veinlets are formed in the deep levels, crosscutting quartz, calcite, dolomite, and barite vein-veinlets are observed in the middle and upper levels. Based on the fluid inclusion data from sphalerite, quartz, and barite; the temperatures of the ore-forming solutions are collected in three groups (150°-220°C: argillic, 250°-350°C: phyllic and >400°C: potassic). Inclusions containing hematite, chalcopyrite, and salt solid phases as well as liquid and gas phases indicate that mineralization formed related to the intrusion. Fluid inclusion data displays that the temperatures and salinity of the ore-bearing solutions in the early stage (porphyry) are higher, and they are lower in the late stage (epithermal). As a result, Çatalçam mineralization developed in two different phases: porphyry Au-Cu and the overlapping epithermal Zn-Pb-Cu-Au mineralization. This intrusion and mineralization are important discoveries that will affect the future of the mineral exploration strategy in the region and expand the target time range and area.