

Geology and Mineralogy of Terziali Gold Mineralization; Implications of Shear Hosted Gold Mineralization in Central Anatolia

Özgür Sapancı,^{1, 2, 4, *} Nezihi Köprübaşı,² Emin Çiftçi,³ and Ufuk Demirel⁴

¹Teck Resources Ltd., Ankara, Turkey

²Kocaeli University, Department of Geological Engineering, Kocaeli, Turkey

³Istanbul Technical University, Department of Geological Engineering, İstanbul, Turkey

⁴Asia Minor Mining Ltd., Ankara, Turkey

*Corresponding author: e-mail, ozgur.sapanci@teck.com

The late Mesozoic-early Cenozoic geologic evolutionary history of the Central Anatolian crystalline complex involved episodes of deformation, metamorphism, and magmatism, and witnessed several episodes of collision during Late Cretaceous to early Paleocene times. The Terziali project area is located 20 km northwest of Kırşehir city center, central Anatolia. Gold mineralization at Terziali is hosted by metamorphic rocks of the Kırşehir Massif, one of the submassifs that formed the Central Anatolian crystalline complex, composed of gneiss, phyllite mica schists, amphibolites, calc schist, marbles, and migmatites. These metamorphic rocks consist of two packages, distinct in age and composition, which are divided by the Demirli thrust zone, and the metamorphosed rock sequence is intruded by the Late Cretaceous Çayağzı syenite. The Demirli thrust zone has a 12-km strike length oriented NE-SW, gently dipping to the southeast in the eastern sector and dipping steeply in the west, and cut by several sinistral tear faults. The structural footwall rocks are composed of Permian-aged marble, whereas the hanging wall consists of Carboniferous schist and gneiss of sedimentary origin, containing amphibolites, micaceous (biotite and/or muscovite) schist and quartz-feldspathic gneiss, biotite quartzite, and minor marble horizons. At Terziali, the Demirli thrust zone comprises breccia zones including polymictic matrix-supported and clast-supported breccia and monomictic matrix- and clast-supported facies. Breccia is dominated by rock flour matrix, which is characterized by subangular to rounded clasts that formed by broken crystals and fragments. Exploration activities carried out by Asia Minor Mining have demonstrated that auriferous quartz-dravite-carbonate zones have an outer zone of widespread of illite-sericite-chlorite alteration. The Terziali gold system is characterized by pervasive quartz-dravite-chlorite-carbonate alteration in the breccia zones. Hydrothermal alteration zones from the primary thrust zone outboard into deformed metamorphic rocks, where silicified marble is converted to jasperoid along the contact. Brecciated hanging-wall rocks are pervasively silicified and quartz-dravite-carbonate content increased from the contact zone to the west. Most of the gold mineralization is located in brecciated metasedimentary schist and as auriferous veins cutting the hanging-wall metasedimentary rocks, while silver is dominant at the marble contact. Quartz-dravite-carbonate-rich auriferous fluids formed high-grade gold mineralization that occurred in and along the thrust ramp, dipping steeply about 80° to the southwest.