

Structural Control on a Shear Zone Hosted Gold Mineralization in Gümüşler, Niğde (Turkey)

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The Gümüşler shear zone-hosted Au deposit is hosted by the metapelitic rocks of the Niğde Massif (south-central Turkey). This deposit lies on the western flank of a gneissic dome, and it is enveloped by an extensive epidote ± chlorite alteration halo. Structural evidence and paragenetic associations suggest two distinct mineralization styles, one associated with (i) high-grade Au-Hg-As mineralization within cataclasites concordant with the foliation planes and (ii) high-grade Au-Pb mineralization discordant to foliation planes. The former is mainly hosted by low-angle cataclastic zones extensively developed along the low-angle normal faults that juxtapose the marbles, schists, and amphibole schists at different levels. It is generally accompanied with arsenic sulfide (orpiment + realgar ± arsenopyrite). The latter is confined to quartz-sulfide veins along relatively higher angle (35°–50°) normal faults. These veins host stibnite + pyrite ± galena ± marcasite and gold with a dominant trend of WSW-ENE and are proposed to be the second mineralization style. Subsequent deformational events defined the final geometry of the mineralization. We propose that progressive deformation resulted from unroofing of the Niğde Massif, and associated progressive doming of migmatitic rocks is the mechanism responsible for the formation of the gold mineralization in the deposit. Hydrothermal fluids generated during the doming and synchronous magmatic activities during the ascent of the Üçkapılı pluton and intrusion of the late pegmatitic dikes must have played additional role. In conclusion, all the available evidence and arguments provided here indicate a very strong link between mineralization in Gümüşler and unroofing of the Niğde Massif, possibly as a core complex.