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An Epithermal Au Mineralization within a Dextral Strike-Slip Deformation Corridor; Karadere Low Sulfidation Epithermal Deposit (Balıkesir-Turkey)

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Karadere low sulfidation type epithermal gold deposit is located within NE-SW trending dextral deformation corridor in southern part of Biga Peninsula, nortwest Turkey. This corridor is 80 km long and 10 km wide, and gold deposit is hosted by the volcanic rocks emplaced into the pull-apart basin within the corridor. This work involves structural mapping of veins and faults as to identify the geometrical and spatial relationships between them; slip data collection to find main pressure-tension axes and stress directions; oriented sample collection along predetermined traverses; and petrographical analyses to identify characteristics of hydrothermal phases, quartz mineral textures and dynamic recrystallization textures. The paleostress findings based on analyses of structural data collected from NE-SW trending show that the principle stress directions are NW-SE (03°/127°) for $\sigma 1$ (contraction) and NE-SW (06°/217) for $\sigma 3$ (extension) and they are approximately horizontal, also $\sigma 2$ indicates an approximately vertical orientation .The relative orientation of the principle stress directions with respect to the NE-SW deformation zone suggests that the faults were formed in a dextral strike-slip tectonic regime. The strike directions of fault sets measured within the deformation zone shows that they occur in mostly two dominant trends as N0°-30°W and nearly E-W. Based on the geometric relations between the principle stress directions and predominant directions for different fault sets, the N70°E-N80°W (nearly E-W) trending faults resemble to R (synthetic); N0°-30°W (NNW-SSE) dominant faults resemble to R'(antithetic) shears with respect to Riedel Shear Model. This work reveals that the faults are integral component of a pull-apart basin formed by dextral strike-slip fault; and the mineralized veins are conformable to N0°-30°W and N70°E-N80°W striking dextral faults with normal-slip component.

The petrographic and textural studies resulted in identification of two hydrothermal phases for the silicification; early and late silicification phases. The petrographic studies also enabled the recognition of bladed textures within the main mineralized veins. Microstructural analyses of the veins formed during early silicification phase yielded a predominant trend of E-W whereas those formed during late silicification phase yielded predominant directions both in E-W and N10°-20°W. The spatial correlations between fault and vein geometries with respect to Riedel Shear Model showed that the early silicification phase is conformable to the R-shear formed during early stage of strike-slip faulting and late silicification phase is conformable both with the R and R'-shears formed during the later stages of deformation. Also, the existence of bladed textures indicate periodic crack-seal and boiling events, while existence of dynamic recrystallization textures indicate syn-tectonic silicification and mineralization.

Keywords: Dynamic Recrystallization Textures, Epithermal, Low Sulfidation, Paleostress, Principal Stresses, Quartz Vein, Quartz Textures, Structural Control