Structural Characteristics of the Suoluogou Gold Deposit in Muli County, West Sichuan Province

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The Suoluogou gold deposit in Muli County of Sichuan Province is located in the southern section of the Ganzi-Litang suture zone (Figs. 1a, b), which is the largest gold deposit discovered in this suture zone in recent years. At present, the exploration of the Suoluogou gold deposit is still in progress, and the amount of resource is increasing.

Fig. 1. (a), Simplified tectonic map of the south Sanjiang area; (b), Simplified geological map of the Ganzi-Litang suture zone; (c), Geological sketch map of the Suoluogou gold deposit; (d), Geological map of the Suoluogou gold deposit.

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The discovery of this deposit is a major breakthrough of gold deposit prospecting in the Ganzi-Litang suture zone, and is also a key breakthrough in the history of gold exploration in Sichuan Province. Till now, the scale of this deposit has amounted to be a super-large one, with a unique deposit type.

This ore district is structurally located in the stress concentration position of southeastern plunging part of Tangyang anticlinorium. Several directional structures were developed and every group of faults has experienced multi-stage activities. The strikes of the faults are dominantly four groups, i.e., NW, nearly SN, NE and nearly EW-trending, of which the NW- and NE-trending faults are especially developed and have a larger scale. In the early stage, the ore district was affected by the southward thrust - nappe - decollement shear deformation, and developed nearly EW-trending interlayer thrust nappe - decollement zone. Then the district underwent EW-trending compression and doming of the north Tangyang dome, and the main structure line consequently appeared as southward convex (Fig. 1c). Therefore, the nearly EW-trending faults intimately related to the gold mineralization, transformed to NEE (Fig. 1d), and they strictly controlled the enrichment regularity and development degree of the oxidized ores in the deposit.

The ore-controlling north-dipping, EW-NEE-trending faults have dip angles of 50°–70°, and their deformational features are indicative of the thrust-nappe and ductile - brittle natures (Fig. 2). In the Suoluogou ore district, the late NE-trending strike-slip shear transformed the early faults, and filled with quartz and calcite veins, resulted in the further enrichment of gold mineralization. The secondary roughly EW-NEE-trending faults adjacent to the main EW-NEE faults are favorable for the formation of high-grade ores. The subsequent regional uplift exposed the orebodies on the surface, and these orebodies were oxidized to secondary enriched industrial orebodies, which are easily to be extracted and concentrated. In this study, we discovered gold mineralization clues along the EW-NEE faults in both sides of the Suoluogou gold deposit. Similarly, the distribution of the mineralized alteration belts is controlled by the EW-NEE faults, but the mineralized host rocks differ from Suoluogou. The host rocks of the east Wajingou mineralization consist of sandstone and sandy slate, whereas the west is a suit of ophiolitic melange. The gold mineralization becomes much stronger in the intersection between the EW-NEE-trending faults and other direction faults. It is further inferred that the gold mineralization in this district do not show any preference for host rocks, and that the EW-NEE-trending faults are the dominant ore-controlling factor.

The EW-NEE-trending faults in the Suoluogou gold deposit are favorable for the migration and accumulation of the ore-bearing hydrothermal fluids. These faults provide necessary space for the gold-bearing fluid migration, emplacement and enrichment, and therefore act as the ore-hosting and ore-controlling structures in the ore district.

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Fig. 2. Photos showing structural characteristics of the Suoluogou gold deposit.