

Fluorite-calcite Sm-Nd and zircon U-Pb dating of the Guilaizhuang gold deposit, Luxi Block, Eastern China

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Guilaizhuang deposit is the largest gold producer in southwestern Shandong Province or Luxi Block, which exhibits a special Te-Au mineralization feature different from those in the adjoining Jiaodong Peninsula. Tongshi intrusive complex is the main igneous unit in this area, which composed of syenites and monzonites with crystallization age of ~180Ma, and considered to be a post-collisional magmatism. Syenites and monzonites also intruded into the carbonate sequence in the Guilaizhuang district, and cryptoexplored along an EW-trending fault. The breccias resulted from the cryptoexplosion mineralized intensively, which were extensively cemented by fluorite and calcite. Consequently, the intrusive age of the syenite and monzonite should be the lower limit of the gold mineralization age, whereas the formation age of the fluorite and calcite can represent the upper limit.

Zircons from the syenite and monzonite in the Guilaizhuang open-pit display a U-Pb dating age of 179-180 Ma consistent with those in Tongshi intrusive complex, whereas Sm-Nd isochron constructed by fluorite-calcite mineral pair shows an age of 181 Ma. Based on these two ages, It is conclude that the gold mineralization age is probably at 180 Ma, coeval with the intrusion of the Tongshi complex. Considering the tectonic condition at ~180 Ma in the eastern margin of the North China Craton (NCC), the Guilaizhuang gold deposit was just located in a post-collision setting between the NCC and Yangtze Craton (YC). Therefore, It is proposed that the extensional stress of the crust caused the decompressional partial melting of basement rocks which is considered to be the gold host in this region, and fluorine-rich fluids exsolved from the magmas and dissolved budget gold resource upwards migrating to shallow level. As temperature and pressure decreased, the gold was released from ore-forming fluids, together with the fluorite and calcite as cements of the hydrothermal breccias.

Conclusively, the Guilaizhuang deposit should represent a gold-forming event within the eastern margin of the North China Craton in the post-collisional setting between the NCC and YC during late Triassic to early Jurassic.

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