

Gold mineralization related with craton destruction in the Jiaodong Peninsula, eastern North China Craton

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The world-class gold camps and deposits with a total reserves of >4500 tons in the Jiaodong Peninsula, eastern North China Craton (NCC), demonstrate a number of common features as well as great diversity in a number of geological characteristics compared with previously suggested orogenic gold deposits. Gold mineralization in the Jiaodong Peninsula has the following main features: (1) gold and other ore-forming minerals had multiple sources, either directly precipitated from magmatic fluids or extracted from Precambrian metamorphic rocks by crustal fluids; (2) the migration and enrichment of gold were controlled by a unified fluid system of low salinity NaCl-CO₂-H₂O±CH₄; (3) gold mineralization occurred rapidly, mostly within a few million years during the Early Cretaceous (120 ± 5 Ma); (4) the occurrence and distribution of ore bodies were controlled by secondary faults, and most were spatially and temporally correlated with late Mesozoic granitoids; and (5) gold deposits were predominantly developed in an extensional tectonic setting, with short-duration local strike-slip compression. The above geological and mineralization features differ from lode gold or orogenic gold deposits in other cratons around the world, reflecting the complex interplay of physical and chemical processes at a depositional trap. This huge gold mineralization event coincided with the peak of lithospheric thinning and destruction of the NCC, as marked by asthenosphere upwelling, voluminous igneous rocks, and high crustal heat flow, which may have provided sufficient heat energy and fluid input required for the formation of the gold deposits. A genetic relation has been established between the formation of gold deposits and decratonic magmatic and hydrothermal activities, and a new model for “Decratonic Gold Deposits” has been proposed.

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