

Geologic evolution and gold metallogeny of China

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China has been producing gold for more than 4,000 years and has been the world's leading gold producer since 2009. China produces about 450 t Au per year and has government stated in-ground reserves of approximately 12,000 t Au.

No more than 20-25% of China's gold is produced from epithermal, skarn, and porphyry magmatic-hydrothermal systems. There are only a few porphyry deposits with resources <100 t Au, all of Mesozoic age and in the continental arc settings of Tibet and Yunnan, and the intracontinental setting of the Lower-Middle Yangtze River Valley. Gold in epithermal deposits is predominantly recognized in late Mesozoic deposits of eastern China and past-producing Quaternary ores in Taiwan. The former includes China's largest producing gold deposit, the 325 t Au Zijinshan high sulfidation deposit, yielding about 7.5 t Au from supergene disseminated ores in China's largest open pit gold mine.

Orogenic gold, or gold deposits in metamorphic rocks, and associated placer deposits, comprise about 65-75 percent of China's gold endowment, with lodes existing as structurally-hosted vein and (or) disseminated orebodies. Although there are widespread exposures of Neoarchean and Paleoproterozoic rocks in China, there are no significant Precambrian orogenic gold deposits. If ancient orogenic gold deposits formed in the pre-Paleozoic rocks, then they have been eroded because these deep crustal rocks that are now exposed in China's cratonic blocks have been uplifted from levels too deep for orogenic gold formation to have occurred during ancient orogenies. The abundance of orogenic gold deposits reflects Paleozoic to Triassic closure of paleo-Tethyan ocean basins between Precambrian blocks derived from Rodinia and Gondwana, as well as late Mesozoic to Cenozoic circum-Pacific events and Cenozoic Himalayan orogeny. The deposits range in age from middle Paleozoic to late Tertiary. The Jiaodong Peninsula contains about one-third of China's overall endowment, and large reserves also characterize East Qinling, West Qinling, and the Youjiang basin. Although gold ores in Jiaodong post-date formation and metamorphism of Precambrian host rocks by billions of years, they are nevertheless best classified as orogenic gold ores. Similarly, although many workers classify the gold lodes in the Youjiang basin and much of West Qinling as Carlin-type gold, they show significant differences from gold ores in Nevada, USA, and are better defined as epizonal orogenic gold deposits. China's orogenic gold deposits are most commonly mined by underground operations with high gold grades of perhaps 3-15 g/t characterizing most operations.