

Geological Evolution of China and the Resulting Spatial-Temporal Distribution of Gold Resources

R.J. Goldfarb^{1,2}, Z. Chang², K. Qiu¹, N.C. White³, and Z. Yang⁴

¹State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Beijing 100083, China

²Center for Mineral Resources Science, Department of Geology and Geological Engineering, Colorado School of Mines, 1516 Illinois Street, Golden 80401, Colorado, USA

³Ore Deposits and Exploration Centre, Hefei University of Technology, Hefei, China

⁴Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

China 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 arcs 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 on Taiwan. The former includes China's largest producing gold deposit, the 326 t Au Zijinshan high sulfidation deposit, yielding about 7.5 t Au of mainly supergene ore. Orogenic gold, or gold deposits in metamorphic rocks, and associated placer deposits, comprise about 65-75 percent of China's gold endowment. Although there are widespread exposures of Neoarchean and Paleoproterozoic rocks in China, there are no significant Precambrian orogenic gold deposits. The abundance of orogenic gold deposits dominantly 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. 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.