

Epigenetic gold deposits in metamorphic terranes include those of the Precambrian shields (approx. 23,000–25,000 t Au), particularly the Late Archean greenstone belts and Paleoproterozoic fold belts, and of the late Neoproterozoic and younger Cordilleran-style orogens (approx. 22,000 t lode and 15,500 t placer Au), mainly along the margins of Gondwana, Laurentia, and the more recent circum-Pacific. Prior to the last 25 years, ores were defined by grades of 5–10 g/t Au; present-day economics and improved mineral processing procedures allow recovery of ores of ~1 g/t Au, which has commonly led to the recent reworking of lower grade zones in many historic orebodies. Most of these deposits formed synchronously with late stages of orogeny and are best classified as orogenic gold deposits, which may be subdivided into epizonal, mesozonal, and hypozonal subtypes based on pressure-temperature conditions of ore formation. Ore formation was concentrated during the time intervals of 2.8–2.55 Ga, 2.1–1.8 Ga, and 600–50 Ma. The temporal pattern, from episodic to more cyclic, broadly mirrors that of crustal growth. The older Precambrian deposits remained protected from uplift and erosion in the centers of buoyant cratons, but such deposits are rare between ca. 1.7 Ga and 600 Ma due to change to more modern-style plate-tectonic processes, with non-preservation of deposits of this age due to uplift and erosion of the ore-hosting and more-vulnerable younger orogenic belts. Giant orogenic gold deposits (>500 t Au) occur in all areas of the globe and formed during each of the time spans. A second type of deposit, termed intrusion-related gold deposits (IRGD), developed landward of Phanerozoic accreted terranes in the Paleozoic of eastern Australia and the Mesozoic of the northern North American Cordillera. These have an overall global distribution that is still equivocal, and are characterized by an intimate genetic association with relatively reduced granitoids.

Timing and global tectonic controls of
gold deposits in metamorphosed terranes

RICHARD J. GOLDFARB

*United States Geological Survey, Box 25046, MS 964,
Denver Federal Center, Denver, Colorado, 80225-0046, U.S.A.*