The Prospects for Hardrock Gold and Tin Deposits in Malaysia

YEAP EE BENG

Department of Geology, University of Malaya
50603 Kuala Lumpur, Malaysia

Tin and gold mineralization in Peninsular Malaysia is found as distinctive parallel belts, which are apparently related to the structures and the tectonic setting of this region. Sarawak and Sabah, across the South China Sea, are hosts to gold deposits related to the magmatism of the region. Tin deposits in the Western and Eastern belts of Peninsular Malaysia that had been mined using hardrock methods are: quartz topaz aplite, cassiterite-magnetite skarn, cassiterite-malayaite skarn, skarn pipes in limestone, greisen, structurally-controlled complex lodes, sheeted veins, and replacement ore bodies in granite. Primary tin deposits mined as soft rock deposits using alluvial mining technologies include: cassiterite-bearing pegmatites, greisen type, xenothermal vein swarm and sheeted veinlets. The best potential for hardrock tin deposits are: (1) Structurally controlled lodes; (2) Greisen types (massive greisens and greisen-bordered veins); (3) Sheeted veins and veinlets, and (4) Cassiterite-magnetite skarns. The Greisen type and sheeted vein types are potential targets for modern opencut bulk mining techniques. Old "lampanned" areas on higher ground upstream of very rich alluvial tin deposits are good targets for systematic exploration and evaluation for hardrock and soft-rock mining. The rather widespread gold mineralization in Peninsular Malaysia is dominated by the deep source Mesozoic mesothermal veins hosted largely in the strongly folded and weakly to moderately metamorphosed rocks of Paleozoic to Triassic age. Based on the style and the location, the primary gold mineralization can be divided into 4 distinct N-S belts. Recent prospecting of long abandoned hardrock gold mines in Gold Belt 2 and 3 had lead to the opening of one hardrock opencut mine (Penjom) while two more (Selinsing and Buffalo Reef) are on stream. In Belt 4, the gold rush of 1989–1991 in the Lubok Mandi area, Terengganu had yielded a hardrock mine exploiting multiple mesothermal gold-quartz veins in shear zone mineralization in Upper Carboniferous metasediments. The most prospective sites for commercial gold deposits are along the 340° to 350° striking regional fractures in Gold Belts 2 and 4, which tap deep source gold-bearing solution. In Gold Belt 3, commercial veins and gold mineralized zones are expected to strike along 345° and 030°. Central Kelantan and northern Pahang show potential for gold-bearing volcanogenic massive sulphides. In East Malaysia, economic gold mineralization in Bau, Sarawak is regarded as the classical epithermal Au-Ag-As-Sb-Pb-S vein type associated with dacitic igneous intrusives of Miocene age. Cu-Mo-Au porphyry, Cu-Au skarns, replacement ore bodies in shales and limestones and disseminations in shales have recently been identified. The Bau area and its extensions towards the north and south are being investigated presently. In Central Sarawak, (Sibu-Sarikei) a younger and still not fully exposed Au-Sb-Ag-Hg mineralized zone is a good prospect for large gold deposits. In the Sabah, gold had been commercially produced from a small Cu-Au porphyry deposit (Mamut) that was genetically related to the Gunung Kinabalu granodiorite-diorite intrusive. Mamut located within the Central Sabah geochemically anomalous belt which shows potential for porphyry, epithermal, massive sulphide and classical Au-Sb-As-Hg vein types gold deposits. It is predicted that the Central Sabah geochemically anomalous belt will become one of the most sought after area for exploration of gold and other metals in the near future.

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