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ABSTRACTS of PAPERS

Keynote Paper 1

The settings and styles of gold mineralization in Southeast Asia

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Gold mineralization in Southeast Asia is associated with a wide range of deposit styles. This study incorporates 90 gold and copper-gold deposits, including porphyry, metasomatic skarn, carbonate-base metal-gold, volcanic-hosted high-sulfidation and low-sulfidation epithermal, quartz lode, volcanogenic massive sulfide and disseminated sediment-hosted. The combined past production and current resources of these deposits exceeds 6,800 tonnes of gold and 50 million tonnes of copper. The majority of the gold is contained in porphyry (64%), low-sulfidation epithermal (17%), carbonate-base metal-gold (7%) and skarn (4%) deposits. Approximately 90% of these deposits (> 95% of the gold) are associated with middle to late Cenozoic magmatic arcs.

Fourteen major magmatic arcs and several secondary arcs of Cenozoic age form a complex border to the Sundaland craton and the northern margin of the Australian platform. This volcano-plutonic chain extends more than 12,000 km from Taiwan in the northeast, through the Philippines and Indonesia, to Myanmar in the northwest. The arcs are constructed on basement which comprises oceanic and continental crust. The Philippines and Indonesia hold more than 90% of the known gold in the region, contained in deposits which cluster along short sectors of middle Tertiary to Pleistocene arcs. In eastern Malaysia, gold mineralization is related to Neogene intrusions. In northern Taiwan, gold deposits are hosted by Pleistocene intrusions and in northcentral Myanmar. mineralization is associated with a middle to late Tertiary arc sector. Porphyry and epithermal mineralization styles predominate, while skarn, carbonate-base metal-gold, sediment-hosted and volcanogenic massive sulfide/ exhalative deposits are less abundant.

Mainland Southeast Asia comprises four major crustal plates, each defined by a series of tectonostratigraphic belts formed upon preCenozoic continental basement. These include cratonic platforms, fold belts, magmatic arcs, volcano-sedimentary rift basins, and metamorphic terrains. Late Paleozoic to Mesozoic volcano-plutonic arcs characterize the fold belts developed along continental margins adjacent to intra-plate collision zones, indicated by ophiolitic sutures. Mineralization within these fold belts is commonly localized within anticlines and structurally complex regions. Other prospective geological settings are suture zones, major strike-slip faults, structural domes and the margins of rift basins. Gold mineralization comprises quartz lode (common), skarn and porphyry (subordinate), and disseminated sediment-hosted, massive sulfide and volcanic-hosted epithermal (minor) systems.

Gold mineralization in Southeast Asia is spatially and temporally related to intrusions and volcanic centers. Porphyry, skarn and high-sulfidation epithermal deposits are closely related to intrusions emplaced at shallow depths. Low-sulfidation epithermal systems include vein, stockwork and minor disseminated styles, which typically are located within or adjacent to volcanic centers. Carbonate-base metal-gold deposits occupy diatreme settings in the deeper portions of low-sulfidation epithermal systems. Disseminated sediment-hosted deposits occur in calcareous rock sequences in both proximal and distal settings to intrusions. Volcanogenic massive sulfide and exhalative deposits are developed in sea floor extensional settings. Quartz lodes are typically structurally-controlled and hosted by preCenozoic metasedimentary and sedimentary rocks.