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**Title:** CIRCUM-PACIFIC ORE DEPOSITS

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**Abstract:** The Meso-Cenozoic orogen of the Pacific Rim, including cordilleran margins, island arcs, and accreted terranes, is the type example of subduction-related arc and back-arc metallogeny. Porphyry Cu-Mo/Au and epithermal Au-Ag deposits are widely distributed throughout much of the orogen, whereas pluton-related, sediment-hosted, and orogenic Au, Fe oxide-Cu-Au, VMS, carbonate-hosted Zn-Pb-Ag, and intrusion-related Sn, W, and Sb deposits are of more localized occurrence. There is a marked tendency for economically pre-eminent metal concentrations to occur either as areally restricted, typically orogen-parallel belts formed during relatively short epochs (commonly 10 m.y. or less) or as isolated giant deposits. The result is a highly inhomogeneous, apparently random distribution of major metallogenic belts and giant deposits at the orogen scale.

The controls and influences on metal endowment are diverse and complex. Magma chemistry, particularly degree of fractionation and redox state, is a fundamental control on the overall localization of many deposit types. Host-rock environment (e.g. VMS deposits) and composition (e.g. carbonate-hosted Zn-Pb-Ag, sediment-hosted Au) can also be critical factors. Iron-rich wallrocks may enhance the hypogene grades of porphyry Cu deposits. Mineralization takes place in a broad spectrum of tectonic settings, both extensional and contractional. The former are apparently required for low-sulfidation epithermal and sediment-hosted Au and VMS deposits, whereas the latter favor giant porphyry Cu genesis. Arc-parallel and -transverse fault zones and lineaments also appear to have aided the localization of some deposits. Physico-chemical optimization of ore-formational mechanisms likely also played an important role. Erosion level within the upper 10 km or so of the crust clearly determines both deposit exhumation and preservation and, hence, observed deposit distribution.

Notwithstanding these widely recognized ore controls, the precise reasons for the locations of most major metal concentrations remain enigmatic, perhaps suggesting that other less obvious factors are also involved. One of these, widely debated over the years, is the preconcentration or inheritance of metals at either mantle or crustal depths. Whether or not such a phenomenon exists, the tendency for some metals, perhaps most notably Au, to be concentrated in relatively restricted crustal segments as different deposit types formed at different times (e.g. Great Basin and contiguous areas of the U.S.A., Colombian Andes) may be taken to suggest some sort of lithospheric

predisposition. The nature of this predisposition and its linkage to the recurrent introduction and concentration of a particular metal or metal suite is an economically crucial question to be addressed by future research.