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A classification of mineralxy3 systems, overviews of plate tectonic margins and examples of ore deposits associated with convergent margins

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Abstract

In this contribution I present definitions of mineral systems, followed by a proposed classification of mineral deposits. The concept of mineral systems has been tackled by various authors within the framework of genetic models with the aim of improving the targeting of new deposits in green field areas. A mineral system has to be considered taking into account, by and large, space-time patterns or trends of mineralisation at the regional scale, their tectonic controls and related metallogenic belts. This leads to a suggested classification of mineral systems, together with a summary of previous ideas on what is without doubt a kind of "mine field", because if a classification is based on genetic processes, these can be extremely complex due to the fact that ore genesis usually involves a number of interactive processes. The classification presented is based on magmatic, magmatic-hydrothermal, sedimentary-hydrothermal, non-magmatic, mechanical-residual processes

An overview of plate tectonics (convergent and divergent margins) is discussed next. Convergent plate margins are characterised by a tectonic plate subducting beneath a lower density plate. Convergent plate margins have landward of a deep trench, a subduction-accretion complex, a magmatic arc and a foreland thrust belt. An important feature is the subduction angle: a steep angle of descent, is exemplified by the Mariana, or Tonga-Kermadec subduction systems, conducive to porphyry-high-sulphidation epithermal systems, whereas in an intra-arc rift systems with spreading centres is conducive to the generation of massive sulphide deposits of kuroko affinity. A shallower subduction zone is the domain of