

Tungsten and Tin Deposits in China through Geological history

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The spatial and temporal distribution pattern of tungsten and tin deposits in China is intimately related to the regional geodynamic evolution. The Neoproterozoic (850-790 Ma) tin deposits are associated with peraluminous, highly fractionated, and volatile enriched (boron and fluorine) S-type granites sourced from melting of ancient crust under a post-collisional setting related to the assembly of Rodinia supercontinent. The Early Paleozoic (450-410 Ma) tungsten and tin deposits are genetically associated with highly fractionated S-type granites formed during post-collisional stage and were derived from partial melting of a thickened continental crust in the context of Proto-Tethyan assembly. Granitoids associated with Late Paleozoic (310-280 Ma) tungsten deposits were derived from the melting of ancient and juvenile crust with I-type affinity associated with the closure of the Paleo-Asian Ocean. The Middle to Late Triassic (250-210 Ma) tungsten and tin deposits are related to the assembly of the Pangea supercontinent although their geological setting shows variations. The extensive Middle Jurassic to Cretaceous tungsten and tin mineralization involves two stages at 170-135 Ma and 135-80 Ma. The former stage is associated with highly fractionated S- and I-type granites which are products of partial melting of thickened crust with heat input possibly induced by a slab window associated with the Paleo-Pacific oceanic plate subduction beneath the Eurasian continent. The later stage is closely associated with NNE-trending strike-slip faults along the Eurasian continental margin and coeval with the formation of rift basins, metamorphic core complexes, and porphyry-epithermal Cu-Au-Ag deposits. These processes, which were instrumental for the formation of a wide range of mineral deposits, can be ascribed to regional lithospheric thinning and delamination of the thickened lithosphere and thermal erosion in a post-subduction extensional setting. The Late Cretaceous to Early Tertiary (121-56 Ma) tin deposits in southwest China are associated with S-type granite or I-type granodiorite in a back-arc extensional setting of Neo-Tethys plate subduction.