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Temporal-spatial distribution of metallic ore deposits in China and their geodynamic settings

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The ore deposits in China are divided into 6 groups and further into 14 metallogenic provinces. The Precambrian group consists of a Neoarchean province in North China Craton (I–1) that hosts several VMS deposits, a Proterozoic province in North China Craton (I–2) that hosts the 1570 Ma Bayan Obo carbonatite-related REE–Nb deposit and the 830 Ma Jinchuan magmatic Ni-Cu deposit, a Proterozoic province in South China Block (I–3) that hosts several IOCG deposits. Many of these deposits are thought to be related to continental rifting. The second group in the Central Asian Orogenic Belt is divided into an Ordovician-Devonian province (II–1) that formed during the subduction of Paleo-Asian ocean, a Carboniferous-Triassic province (II–2) resulted from the final closure of the ocean, and a Permian-Triassic province (II–3) that formed after arc-continent collision. Representative ore deposits in these provinces are the 478 Ma Duobaoshan porphyry Cu-Mo deposit and the 445 Ma Bainaimiao porphyry Cu-Mo-Au deposit (II–1), the 362 Ma Axi epithermal Au deposit, the 332 Ma Tuwu porphyry Cu deposit and the 284 Ma Huangshanxi magmatic Ni-Cu deposit (II–2), and the 245 Ma Chehugou porphyry Mo-Cu deposit, the 225 Ma Jinchangyu orogenic Au deposit and 216 Ma Hongqiling magmatic Ni-Cu deposit (II–3). The third group occur in the Tethyan domain and includes an Ordovician-Devonian Qilian-Kunlun-Sanjiang province (III–1) related to Proto-Tethyan orogenesis, a Carboniferous-Triassic province (III–2) formed during the evolutuon of Paleo-Tethys, and an Jurassic-Cretaceous province associated with the Neotethyan subduction. Representative ore deposits include the 447 Ma Baiganhu W-Sn skarn deposit in a continental arc setting and the 412 Ma Xiarihamu magmatic Ni-Cu deposit in post-collisional setting (III–1), the Laochang VMS Pb deposit related to OIB-like basaltic volcanism, the 223 Ma Pulang porphyry Cu deposit in a continental arc and the 230-210 Ma Carlin-like Au deposits in post-collisional setting in West Qinling and Youjiang basin (III–2), and the 88 Ma Tongchanggou porphyry Mo deposit, and the 83 Ma Gejiu Sn skarn deposits (III–3). The fourth group is associated with the Pacific subduction beneath SE China and comprises a Jurassic province (IV-1) and a Cretaceous province (IV-2). The former hosts the ~160 Ma Nanling W-Sn skarn ore cluster and the latter hosts the ~135 Ma skarn-porphyry Cu-Au deposits in the Tongling region plus the ~125 Ma Jiaodong-type Au deposits. The fifth group is the Emeishan metallogenic province (V), comprising world-class magmatic Fe-Ti-V oxide deposits, that is related to mantle plume activity in the Permian. The sixth group formed due to the Cenozoic continental collision includes the Sanjiang province (VI–1) and the Tibet province (VI–2) associated with oblique collision and vertical collision respectively. Ore deposits are the 41-35 Ma Jinshajiang-Ailaoshan porphyry-skarn Au-Cu ore belt and ~30 Ma Jinding sediment-host Zn-Pb deposi (VI–1), and the ~15 Ma Qulong and Jiama porphyry Cu deposits (VI–2).