

Regional Metallogeny of Mo-Bearing Deposits in NE China

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With many new discoveries of giant Mo deposits in the past decade, NE China has become the largest molybdenum mineralization region in China. The Xilamulun district is in the southern part of NE China and contains 25 Mo deposits and prospects, predominantly of porphyry type. These deposits are mostly along the E-striking Xilamulun fault. Re-Os dating of hydrothermal molybdenite from four deposits in the northern Xilamulun district revealed mineralization ages of 137–129 Ma (129.4 ± 3.4 Ma for Aolunhua, 135.3 ± 2.6 Ma for Shabutai, 136.4 ± 0.8 Ma for Haisugou, and 136.1 ± 6.6 Ma for Banlashan), in general agreement with the crystallization ages of their host granitoids.

The compilation of existing data on Mo-bearing deposits in NE China, including the new data of this study, shows that Mesozoic Mo deposits in this region have a wide range of ages, from ~250 to 90 Ma. We propose that they are linked to three tectonic-magmatic events: (1) Triassic Mo deposits (250–220 Ma) are mainly distributed along the E-trending Xilamulun fault and are related to post-collisional crustal extension following the final closure of the Paleo-Asian ocean; (2) Jurassic Mo mineralization (200–140 Ma) displays a clear younging trend from southeast to northwest, coincides with the regional magmatism trend, and is interpreted to be related to the northwestward flat-slab subduction of the Paleo-Pacific plate beneath the Eurasian continent that started in the Early Jurassic (ca. 200 Ma); (3) Cretaceous Mo mineralization (140–90 Ma) shows a reversed migration trend from northwest to southeast and can be explained by the coastward migration of slab rollback related to lower crust delamination, asthenospheric upwelling and lithospheric thinning in eastern China. The spatial-temporal distribution of Mesozoic Mo mineralization is important for regional metallogeny and exploration. Recently numerous epithermal Au (Cu, Mo) deposits have been recognized in the southeast margin of NE China. According to this study, we predict that hidden porphyry/skarn systems could be located beneath these epithermal deposits.