

Late Mesozoic magmatism and tectonic evolution in the Southern margin of the North China Craton

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Late Mesozoic granitic magmatism (158–112 Ma) are widespread in the southern margin of the North China Craton (NCC), contemporary with many world-class Mo-Au-Ag-Pb-Zn polymetallic deposits. There are abrupt changes in the elements and isotopic compositions of these granites at about 127 Ma. The early stage (158–128 Ma) granites show slightly or no negative Eu anomalies, large ion lithophile elements enriched and heavy REE depleted (such as Y and Yb), belonging to typical I-type granite. The late stage (126–112 Ma) granite are characterized by A-type and/or highly fractionated I-type granite, with higher contents of SiO₂, K₂O, Y, Yb and Rb/Sr ratio and lower contents of Sr, δ Eu value and Sr/Y ratio than that of the early-stage granites. Moreover, the whole rock Nd and Hf isotopic composition of the granites younger than 127 Ma show more depleted than those of the older one. The two stages of Late Mesozoic granites were derived from a source region of the ancient basement of the southern margin of the NCC incorporated the mantle material. The late stage (126–112 Ma) granites contain more fractions of mantle material with depleted isotopic composition than the early ones. The granites record evidence for a strong crust-mantle interaction. They formed in an intracontinental extensional setting which was related to lithospheric thinning and asthenospheric upwelling in this region, which was possibly caused by westward subduction of the Paleo-Pacific plate. 127 Ma is a critical period of the transformation of the tectonic regime.