

Temporal and spatial distribution patterns and crust - mantle interaction processes in the Mesozoic magmatic - metallogenic belt along the Yangtz River, Anhui Province

DU, Y. China University of Geosciences, Beijing, China

ABSTRACT

Temporal and spatial distribution patterns of the magmatic rocks and associated ore deposits in the Mesozoic magmatic - metallogenic belt along the Yangtz River, Anhui Province are used to determine and discuss the crust - mantle interaction processes. The magmatic rocks are Cu - Au mineralized high - K calc - alkalic intermediate - acidic (CAK) and Fe - Cu mineralized high - Na alkalic - calc intermediate - basic intrusive rocks (FCN) in the central part of the belt and grade to Cu - Mo - Pb - Zn - Ag mineralized calc - alkalic granitoids (CMG) and A - type granites (AG) in the southern and northern parts of the belt. Samples from the CAK and CMG yield Rb - Sr isochron ages of 137 ~ 140Ma with $(^{87}\text{Sr}/^{86}\text{Sr})_0 = 0.7060 \sim 0.7101$, while those from the FCN and AG yield the ages of 120 ~ 129Ma with $(^{87}\text{Sr}/^{86}\text{Sr})_0 = 0.7047 \sim 0.7077$.

The Sr isotope ratios, Cr/Th ratios (1.4 ~ 3.1), Eu/Eu* ratios (0.79 ~ 1.05) and initial epsilon (Nd) values (-16.6 ~ -6.3) for the CAK and CMG are consistent with magma derivation from old metamorphic basement rocks rich in metallogenic elements through a two - stage process of mantle - derived magma underplating caused by primary lithosphere extension and subsequent partial melting. On the basis of Sr isotope data, Cr/Th ratios (3.4 ~ 13.8), Eu/Eu* ratios (0.86 ~ 1.13) and initial epsilon (Nd) values (-7.7 ~ +1.4), the FCN and AG are considered to be formed through syntaxis with material input from the mantle that resulted from further lithosphere extension followed by mantle - derived magma underplating on a large scale.