

Time-space relationships of ore-related igneous activity: Lishui Basin, middle and lower Yangtze River

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Eight Mesozoic sub-volcanic and intrusive rocks in the Lishui Basin have been selected for zircon U-Pb dating and Lu-Hf isotopic analysis. The Laohutou, Datongshan, Daweizhuang, Yeshanao, Yanwaqiao, Xibeishan, Changshantou and Jianshan porphyrites yield concordant early Cretaceous ages of 130.5 ± 1.6 Ma, 136.0 ± 3.4 Ma, 132.7 ± 2.7 Ma, 127.0 ± 1.9 Ma, 129.4 ± 1.7 Ma, 133.2 ± 2.1 Ma, 131.1 ± 2.3 Ma and 127.4 ± 1.8 Ma, respectively. Zircon $\epsilon_{\text{Hf}}(t)$ values for these rocks range from -3.54 to -9.11, mostly between -3.54 and -5.93, suggesting sources similar to those for coeval igneous rocks in other volcanic basins along the middle and lower Yangtze River. Considering the geochemical characteristics of coeval magmatic rocks in the middle and lower Yangtze River beach and its adjacent areas, this paper proposes a model of slab rollback to explain the Mesozoic magmatism in the east-central part of China continent. In the middle-late Jurassic to early Cretaceous (170-145 Ma), the Pacific plate started to subduct beneath the Eurasian continent, producing a compressive tectonic setting, and magmatism progressed from coast to the inland. The magmas of this period were derived mostly from partial melting of ancient crust. After ~135 Ma, the subduction weakened, and the rollback of the subducted Pacific plate produced an extensional environment. This led to the formation of volcanic basins, the partial melting of enriched mantle sources and less ancient crust, and the intrusion of voluminous intermediate-mafic igneous rocks.