

Cretaceous magma evolution related to slab break-off and rollback along the Fujian coastal area of southeastern China: Evidence from Late Yanshanian plutons

ZHEN LI^{1,2}

¹State Key Laboratory of Petroleum Resources and Prospecting, China University of Petroleum, Beijing 102249, P.R. China (lizhen0219@gmail.com)

²College of Geosciences, China University of Petroleum, Beijing 102249, P.R. China (lizhen@cup.edu.cn)

The Cretaceous plutonic suites along the Fujian coast of China include abundant I-type and A-type granitoids and lesser gabbroids, which define a linear NNE–SSW-trending belt of magmatism, and are important for understanding the development and evolution of the Late Yanshanian orogeny in southeastern China.

Geochronological data from thirty Cretaceous mafic and felsic plutons indicates their emplacement mainly from around 125 to 90 Ma, with a major peak from 115 to 90 Ma, and a subordinate peak from 125 to 115 Ma. Besides their temporal and spatial coexistence, all these intrusive rocks have similar geochemical patterns which point to involvement of components from a depleted asthenospheric mantle source for the parental magmas, most probably by magma mixing.

The first appearance of sparse I-type granitoids with post-collisional extensional granite affinities, and the Baijuhuajian and Suzhou A-type granites, mark the beginning of extension during the Early Cretaceous at ca. 125 to 119 Ma. The subsequent development of bimodal magmatism, with numerous arc-related mafic gabbros and I-type granites, together with some A-type granites, suggests a major igneous event took place in the area from 115 to 90 Ma in response to back-arc extension.

On the basis of petrology, geochronology, tectonics, and elemental and isotopic geochemistry, we speculate that break-off and rollback of the subducting Palaeo-Pacific Plate during the Cretaceous were responsible for the Late Yanshanian regional tectono-magmatic evolution in the area. We suggest that this process facilitated a strong and rapid linear upwelling of the asthenospheric mantle beneath the coastal area of southeastern China, with consequential extension of the overlying continental lithosphere, and ultimately the large-scale Late Yanshanian magmatism of the study area.