

Continental accretion by transition from oceanic arc to continental arc in arc-continent collisional belt: evidence from geochronology and geochemistry of the Neoproterozoic diorite suites along the Jiangshao Suture Zone, southern China

XIAO-LEI WANG¹, XU-JIE SHU¹ AND DI WANG¹

¹State Key Laboratory For Mineral Deposits Research, School of Earth and Engineering, Nanjing University, Nanjing 210046, PR China

Arc-continent collisional belt has been shown to be the dominant area for continental crust accretion. However, the detailed processes for the geochemical transition from juvenile basaltic island arc to average andesitic continental crust still remain unresolved, although the significance of the fractional crystallization of basaltic magmas and the delamination of lower crust have been noted. Neoproterozoic igneous rock outcrops are well developed around the margins of the Yangtze Block, southern China. The eastern segment of the Jiangnan orogen (JO) that is located on the SE margin of the Yangtze Block was involved in a complex subduction-accretion process, providing a good example for studying the Neoproterozoic continental accretion during the formation and evolution of an arc-continent collisional belt.

Previous studies have shown an Early Neoproterozoic oceanic subduction in the period 970-870 Ma, as represented by the Shuangxiwu arc magmatism in the eastern JO. However, the tectonic settings and petrogenesis of the Middle Neoproterozoic igneous rocks in the area are greatly debated, mainly involved in three models (arc-collision, mantle plume and plate-rift). This study presents the geochronological and geochemical results of the diorite suites along the Jiangshao Suture Zone that have been suggested to represent the "bond" between the Yangtze and Cathaysia Blocks within southern China. The dating results suggest the diorites formed episodically (at 860 Ma, 850 Ma, 835 Ma and 825 Ma), and each episode was associated with mafic intrusive rocks. The 860-835 Ma diorites formed by the fractional crystallization of associated mafic magmas, indicating a continental arc setting. In contrast, the 825 Ma diorites formed by the remelting of juvenile basaltic crust in a continental rift setting. The Neoproterozoic continental accretion in the eastern JO was accomplished by the island arc magmatism, arc-continent collision, continental arc magmatism and the subsequent reworking of juvenile crust within the period ca. 200 Ma.