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**Early Cretaceous Magma Mingling in Xiaocuo,
Southeastern China continental margin**



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Magma mingling has been identified within the continental margin of southeastern China. This study focuses on the relationship between mafic and felsic igneous rocks in composite dikes and plutons in this area, and uses this relationship to examine the tectonic and geodynamic implications of the mingling of mafic and felsic magmas. Mafic magmatic enclaves (MMEs) show complex relationships with the hosting Xiaocuo granite in Fujian area, including lenticular to rounded porphyritic microgranular enclaves containing abundant felsic/mafic phenocrysts, elongate mafic enclaves, and back-veining of the felsic host granite into mafic enclaves.

LA-ICPMS zircon U-Pb analyses show crystallization of the granite and dioritic mafic magmatic enclave during ca. 132 and 116 Ma. The host granite and MMEs both show zircon growth during repeated thermal events at ~210 Ma and 160-180 Ma. Samples from the magma mingling zone generally contain felsic-derived zircons with well-developed growth zoning and aspect ratios of 2-3, and mafic-derived zircons with no obvious oscillatory zoning and with higher aspect ratios of 5-10. However, these two groups of zircons show no obvious trace element or age differences. The Hf-isotope compositions show that the host granite and MMEs have similar $\epsilon_{\text{Hf}}(t)$ values from negative to positive which suggest a mixed source from partial melting of the Meso-Neoproterozoic with involvement of enriched mantle-derived magmas or juvenile components. The lithologies, mineral associations, and geochemical characteristics of the mafic and felsic rocks in this study area indicate that both were intruded together, suggesting Early Cretaceous mantle–crustal interactions along the southeastern China continental margin. The Early Cretaceous magma mingling is correlated to subduction of Paleo-Pacific plate.

