A missing ca. 120 Ma magmatic arc outboard South China?

XIAO-YAN JIANG[1], XIAN-HUA LI[1], W.J. COLLINS[2], HUI-QING HUANG[2]

[1] Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, PR China (lixh@gig.ac.cn)

[2] School of Environmental and Life Sciences, University of Newcastle, Callaghan, NSW 2308, Australia

The South China Coast area is characterized by intensive and widespread Cretaceous granitoid and volcanic rocks that preserve a partial record of the circum-Pacific accretionary orogen during the Mesozoic. Increasing numbers of isotopic age data reveal a “magmatic quiescence” at ca. 120 Ma punctuating the Cretaceous magmatism. Detrital zircons from the modern river systems confirm the scarcity of ca. 120 Ma magmatic rocks onshore. Understanding the mechanism of this transient magmatic quiescence has significant implications for evolution of the accretionary orogeny in East Asia. Hainan Island, situated at the southernmost margin of the South China, is characterized by widespread occurrence of Permian to Cretaceous granitoid rocks and the Cretaceous basins. We performed integrated in situ analyses of U-Pb age and Hf-O isotopes for detrital zircons of two sandstone samples from the Cretaceous Baisha basin. Our data reveal three major age peaks at ca. 120 Ma, ca. 155 Ma and ca. 235 Ma. Zircons of these ages are mostly euhedral and show typical magmatic oscillatory zoning, suggesting short-distance transport from nearby magmatic sources. Because ca. 120 Ma magmatic records are extremely rare, detrital zircons of this age population suggest their derivation from a source proximal to Hainan Island but presently missing. In situ Hf and O isotpic data suggest an increasing contribution of depleted mantle or juvenile crust to the Cretaceous magmas, consistent with magmatic hybridization at an active continental margin. Our data provide new evidence for ongoing arc magmatism outboard southernmost South China in late Mesozoic. It is noteworthy that the 120 Ma magmatic quiescence onshore is coincident with the high-grade metamorphism and top-to-NW ductile thrust in the Changle–Nan'ao Metamorphic Belt. Thus, the Late Mesozoic accretionary orogen in this area is most likely “interrupted” by collision of the West Philippines micro-block to South China along the SE Coast.