

The Tailuko belt, Taiwan, revisited: New zircon U-Pb ages and Hf isotopes from Hoping granitoids

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The Tailuko belt is the western part of the Tanan'ao metamorphic complex, known as the oldest geological unit of the Taiwan orogenic belt resulting from collision between the northern Luzon arc and the Eurasian continental margin. The Tailuko belt consists mainly of Permian to Cretaceous metasedimentary rocks intruded by Cretaceous granitoids in localities. This study reports in situ zircon U-Pb ages and Hf isotope data of eight granitoids drilled from 46 to 530 m depths in Hoping area, the northern Tailuko belt. All samples have magmatic zircons dated at ~90 Ma, interpreted to represent emplacement ages of the granitoids. In addition, there are abundant inherited zircons that show a wide age range from ~300 to 90 Ma, mostly around 120 Ma, with several old grains of 1800-2400 Ma. Integrated with zircon Hf isotopic data, our results allow us to conclude: (1) the granitoids in Hoping area were emplaced at ~90 Ma in the late Cretaceous, (2) the magmatic zircons show $\epsilon\text{Hf}(90 \text{ Ma})$ values of +8 to -5, indicative of a binary mixing in the magma genesis involving a juvenile mantle and an old crust, (3) similar magmatic activities of significant mantle input may have occurred earlier in the Mesozoic, and (4) the old crustal component has Paleoproterozoic Hf model ages (T_{DM}^{C}) of ~2500-1800 Ma. The above data support that the granitoids in the northern Tailuko belt can be correlated to coeval magmatic rocks emplaced in the Eurasian continental margin, ~300 km west of the present Tailuko belt. This is consistent with the "yo-yo" tectonic model that involves rifting of a micro-continent from the Eurasia continental margin, its drifting/accretion to the western Philippine Sea margin and backward voyage in association with the northern Luzon arc to build up the Taiwan orogen.