

Magmatic variation caused by subduction switch and its implications for supra-subduction crustal modulating and ribbon continental bending in the Central Asian Orogenic Belt

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Identification of subduction switch in ancient accretionary orogeny is crucial for unravelling the active margin evolution history of accretionary orogenesis. Two episodes magmatism in D₃ and C₂ were developed respectively in Northern Yili Block. We select two groups of representative granitoids from these two distinct magmatic episodes for this study. Our zircon U-Pb isotopic data indicate that Group 1 granitoids were emplaced at 374-369 Ma and Group 2 emplaced at ca. 304 Ma. Our geochemical data indicate that two groups of granitoids were derived from a hybridized source of the Proterozoic basement rocks with various degrees of Paleozoic juvenile materials input, i.e. Group 2 granitoids have greater contribution of Paleozoic juvenile materials than Group 1. The granitoids define striking secular $\epsilon_{\text{Hf}}(t)$ - $\epsilon_{\text{Nd}}(t)$ trend, these values were lower and declining from 400 to 350 Ma, but increased from 350 to 300 Ma to higher values. Besides, the primary magma temperature of granitoids was relatively low at 400-350 Ma, but increased rapidly to become high-T magma in the period of 350-300 Ma. The temporal variations of $(\text{La}/\text{Yb})_{\text{N}}$ for the granitoids imply crustal thickening of the YB at 400-350 Ma, but thinning at 350-300 Ma. Moreover, the D-C magmatism temporal-spatial features suggest that the spatial migration of magmatic arc was in steps with trench migration, corresponding to the development of accretionary complex and evolution of immature back-arc basin after ca. 350 Ma, coincident with advancing and retreating subduction processes. These characteristics probably reflect a tectonic switch from an Andean-type to a Japan-type active margin at ca. 350 Ma.

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