

Geochronology and Petrogenesis of Late Carboniferous Sanukitoids in Northern West Junggar, NW China

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The sanukitoid is a kind of high-Mg andesites, distinguished from normal andesites that typify arc magmatism in their elevated MgO contents and/or $Mg^\#$ [$=100 \times \text{Mg}/(\text{Mg}+\text{Fe})$], which is special and rare mantle derived rock types that reserved in modern and Archana subduction zones as well as accretionary orogenic belt. The Central Asian Orogenic Belt (CAOB) is a giant accretionary orogen and the most important area of Phanerozoic continental growth around the world. It is evolved through a long-lived orogeny involving multiple episodes of subductions and accretions marking a major phase of continental growth during the Paleozoic. The occurrence of sanukitoids in Hamutusi area between the Boshchekul-Chingiz arc and Zharma Saur arc in northern West Junggar of Northwestern China is of particular importance to a understanding of tectonic setting and evolution history of CAOB. We report the sanukitoids zircon U-Pb age yielded crystallization age of $324.4 \pm 6.9\text{Ma}$ (MSWD=0.109), suggesting its formation during the Carboniferous. Geochemically, the sanukitoids are calc-alkaline, enriched in SiO_2 (58.10-59.01wt.%) and characterized by high MgO (6.09-6.99wt.%) and $Mg^\#$ (61~69), belong to the high-Mg andesite. Moreover, the sanukitoids are enriched in LILEs (e.g. K, Rb, Ba and U) and LREEs, but strongly depleted in HFSEs (e.g. Nb, Ta and Ti), consistent with the geochemical characteristics of subduction-related magmas. They have low Sr contents (192~374 ppm), low Sr/Y ratios (11~25) and high Cr (147~448ppm) and Ni (29.11~119 ppm) concentrations similar to those of typical Cenozoic sanukitoids at the Setouchi Volcanic Belt, SW Japan. The sanukitoids have $\epsilon\text{Nd}_{(t)}$ values ranging from -0.25 to +2.20, indicate their mantle source is more enriched and contribution of subducted sediments melt. We suggest the Hamutusi sanukitoids are possibly derived from a depleted mantle source (or sources) mixing subducted sediments, which formed by the melting subducted sediments and subsequent melt-mantle mixing and interaction, which share the similar mechanism with those of sanukitoids from the Setouchi Volcanic Belt, SW Japan. This study suggest that the West Junggar was still in a subduction setting in the Late Carboniferous.