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Early Stages Arc Volcanism in the Eastern Himalayan Synstaxis, Yarlung Zongbo Suture Zone, Tibet, China: New Zircon Age, Hf Isotopic, Geochemical Constrains and Implication for the Tectonic Evolution History of Neo-Tethys

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The Yarlung Zongbo Suture Zone (YZSZ) is thought to be the most important geological boundary, the collision between the India plate and the Eurasia happened since Cretaceous-Tertiary (Aitchison et al., 2011). The YZSZ, bordered to the north by the Lhasa Block and to the south by the Tethyan sedimentary sequence and the Greater Himalaya, is exposed and dominated by the ophiolite complexes, the ophiolitic mélange, and metamorphic and sedimentary sequences and mélanges reflecting destruction of the Neo-Tethys Ocean. Although the YZSZ has been studied for more than 80 years, several major questions remain unanswered. For example, the timing of the formation of the suture zone and the kinetic processes are still exist hot argument (Allègre et al., 1984; Aitchison et al., 2000; Hébert et al., 2012; etc). Documenting the crustal architecture and geochronology of YZSZ is critical to understand the tectonic evolution of Neo-Tethys between the India plate and the Eurasia.

LA-ICPMS analyses of zircons in two andesites from Namche Barwa syntaxis complex in the eastern branch of YZSZ have yielded ages of 172.6 ± 0.8 Ma and 172.4 ± 0.7 Ma, and $e(\text{Hf})=14.6-16.9$ (T_{DM} ca 190 Ma). The SiO_2 contents of andesites range from 55.7wt% to 57.6wt%, MgO from 4.18wt% to 4.52wt%, TiO_2 from 0.53wt% to 0.57wt%, Na_2O from 2.36wt% to 2.75wt%. In the N-MORB normalized multi-element diagrams, they display strong negative Nb-Ta reflecting the influence of subduction-derived fluids. However, the strong Zr-Hf anomalies rule out the possibility of crustal contamination and suggest, instead, an island arc volcanism from intro-

oceanic arc. Combined with boninites, arc tholeiites and back-arc basalts have been identified so far from Namche Barwa syntaxis ophiolitic mélange (Geng et al., 2006); we suggest that the complex in Namche Barwa syntaxis may well have a crustal architecture that is comparable to the early stage arc from the modern IBM arc-trench system. If we synthesize all the available ages along YZSZ, it can be concluded that the north dipping subduction of the Neo-Tethys was initiated at least before middle Jurassic.

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