

Remnants of a Middle Triassic Oceanic Lithosphere in the Western Yarlung Zangbo Suture Zone, Southern Tibet



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Abstract: Discontinuous ophiolite suites along the Yarlung Zangbo suture zone (YZSZ) in southern Tibet representing remnants of the Neo-Tethyan oceanic lithosphere are considered to be formed between Late Jurassic and Early Cretaceous. Older ophiolite or ophiolitic mélange (e.g. Triassic) to reveal the initial evolution the Neo-Tethyan ocean within the YZSZ have rarely been documented so far. The western YZSZ extending from the Saga to Ladakh area are composed of the northern ophiolitic sub-belt, the Zhongba terrane and the southern ophiolitic sub-belt. In this study, we document structural, petrological and geochronological data of mafic intrusions from the Mayoumu massif in the southern ophiolitic sub-belt of the western YZSZ. Two litho-tectonic sub-units, the southern ophiolitic complex and the northern ophiolitic mélange, are recognized in the Mayoumu massif in terms of structural pattern and petrology. LA-ICP-MS zircon U-Pb dating of gabbro from the ophiolitic mélange yields an age of 243 ± 1 Ma with zircon $\varepsilon_{\text{Hf}}(t)$ values of +7.9 to +13.2. Two samples of diabase samples from the ophiolite yield ages of 131 ± 1 Ma and 124 ± 1 Ma with zircon $\varepsilon_{\text{Hf}}(t)$ values ranging from +10.8 to +15.0 and +12.3 to +15.4, respectively. Geochemically, rare earth elements (REEs) patterns show that these mafic intrusions are similar to those of the normal mid-ocean-ridge basalt (N-MORB). Enrichment of fluid-mobile elements (e.g. Rb and Ba) and depletion of Nb, and Ta suggest that these intrusions were possibly originated from melting of a depleted mantle source influenced by subducted

slab. Our data strongly confirms that the Neo-Tethyan ocean between the Lhasa terrane and Gondwana had been existed since the Middle Triassic at least. The ages of the two diabases from the ophiolitic complex reveal that mafic magma activities within the Neo-Tethyan ocean could be as a continuing process during 120–130 Ma. Emplacement and preservation of older ophiolitic recorder during evolution of the Neo-Tethyan Ocean may be closely related to the occurrence of the Zhongba micro-terranes within the western YZSZ.

Key words: ophiolite, ophiolitic mélange, Yarlung Zangbo suture zone, gabbro, diabase, Zhongba

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