



Zircon U-Pb geochronological constraints on rapid uplifting of the mantle peridotite of the Xigaze ophiolite, southern Tibet

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The Xigaze ophiolite is located in the central segment of the Yarlung Zangbo suture zone, southern Tibet. It is characterized by large amounts of ultramafic units with minor gabbros. The gabbroic rocks of the Xigaze ophiolite occur as layered bodies or fine-grained dikes intruding into mantle sections. Large scale gabbroic bodies are well-preserved in Dazhuqu, Baigang and Jiding. However, their formation time and mechanism are not well understood or interpreted. In this study, nine samples of mafic rocks from the Xigaze ophiolite, including seven gabbros and two rodingites, were selected for in situ zircon U-Pb and Hf isotopic analyses. The U-Pb data yielded identical ages of 124-129 Ma within uncertainties. Positive zircon $\varepsilon_{\text{Hf}}(t)$ values and young model ages indicated that these samples had an origin of depleted mantle source. Combined with previous studies on mafic dikes and radiolarian cherts, it can be concluded that the Yarlung Zangbo ophiolites were formed over a short period of time from 120 to 130 Ma. Hence, a rapid uplifting of the gabbroic rocks and mantle peridotites of the Xigaze ophiolite may have occurred to get intrusion of the diabase/dolerite dikes and sills. It excludes the existence of a long-term ancient magma chamber or lens. It is more likely that the gabbroic rocks are a series of plutonic intrusions beneath an ancient slow-spreading ridge, rather than products of magma chambers. Therefore, the “Chapman detachment model” may be applied to the generation of the Yarlung Zangbo ophiolites.