

Multi-stable isotope variations (Fe-Zn-Cu) along the Yarlung Zangbo Suture Zone (southern Tibet, China)

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The Yarlung Zangbo ophiolites (YZO) are the presumed relics of the Neo-Tethyan oceanic lithospheric mantle, recording geological history from pre-subduction of the Neo-Tethyan Ocean to India-Asia collision. A large volume of serpentinites is exposed along the Yarlung Zangbo suture zone, which provides a unique of geochemical exchanges between the slab and the mantle wedge in the Himalayan region. Here, we provide a comprehensive major, trace element concentrations and Fe-Zn-Cu isotope study of serpentinite samples in the YZO. The serpentinites display a spoon-shaped pattern with flat HREE, depleted MREE, elevated LREE. Furthermore, they have lower values of U/Cs, Li/Cs, Rb/Cs and higher values of Li/U, Cs/Th, Rb/U than the primitive mantle. These geochemical characteristics show that the YZO are similar to those of forearc serpentinites. The $\delta^{56}\text{Fe}$ and $\delta^{66}\text{Zn}$ values of the serpentinites in the YZO range from -0.05 to 0.34 ‰ and 0.11 to 0.38 ‰, respectively. The $\delta^{66}\text{Zn}$ values gradually increase as Zn concentrations decrease, indicating the loss of light Zn isotopes during forearc serpentinitization. The $\delta^{56}\text{Fe}$ values span a large fractionation relative to mantle peridotites, suggesting a high mobility of Fe. Notably, the $\delta^{56}\text{Fe}$ and $\delta^{66}\text{Zn}$ values of the serpentinites in the western- and central- YZO overlap with mantle-like values, while these values decrease in the eastern- YZO. Such variation might reflect a change of chemical geodynamic from East to West along the Yarlung Zangbo suture zone.