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Neo-Tethyan subduction slab-rollback in the southern Lhasa terrane, Tibet: Perspective from zircon U–Pb geochronology, geochemistry and Sr-Nd-Hf isotopes

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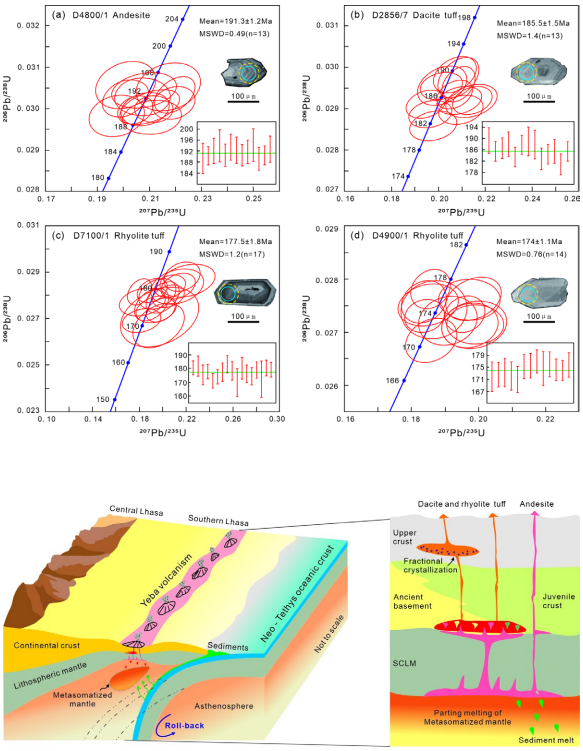

Abstract: The Yeba volcanic rocks preserve important information of the early Neo-Tethys subduction, which is coeval with the Xiongcun Cu ore-formation in the southern Lhasa terrane. We report the Epingsong volcanic rocks of the southernmost Yeba Formation. of the volcanic rocks were emplaced at ca. 191.4–174.0 Ma. All samples obviously have an affinity of the continental margin island-arc, and are rich in LREEs and LILEs but depleted in HFSE. The Yeba andesite is calc-alkaline, medium $Mg^{\#}$ (28.3–50.2), and have low Cr (4.68–36.01 ppm) and Ni (3.63–12.70 ppm), and Eu/Eu* values (1.0–1.13), as well as positive ε_{Nd} value (+3.6) and ε_{Hf} values (-1.3–+10.9). The results indicate that they were probably sourced from the interaction between subducted sediment-derived melts (2–7.5%) and the depleted mantle wedge. The melt was originated from the partial melting of Grt + Sp lherzolite dominated by Sp. The felsic rocks have low $Mg^{\#}$ values (19.2–42.3), and MREE depletion (e.g., Tb, Dy and Ho), and Eu/Eu* (0.76–0.96), as well as variable ε_{Nd} values (0.9–2.9) and ε_{Hf} values (2.1–10.4), with two-stage model ages (t_{DM2}) of 560–1098 Ma. This implies that the magma is sourced from partial melting of amphibole-rich juvenile crust, accompanied by ancient crystalline basement contamination and crustal assimilation. The Yeba volcanic rocks exhibit slightly bimodal characteristics, and likely record an important tectonic transition from Neo-Tethyan subduction compression to transient extension. Slab-rollback triggers this deep dynamic process.

Keywords: Yeba Formation, Neo-Tethyan subduction, southern Lhasa terrane

Reference

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