

Paleozoic ophiolitic melange at the northern Kunlun orogen, Northernmost Tibet

Y. DONG, X. LIU, X. ZHOU, D. HE, Y. YUE, J. ZHANG, H. ZHANG AND G. ZHANG

¹State Key Laboratory of Continental Dynamics, Department of Geology, Northwest University, China.

E-mail: dongyp@nwu.edu.cn

The Kunlun orogen, located at the northern Tibet plateau, can be divided into the Qimantage, Central Kunlun, Southern Kunlun and Songpan-ganze belts with distinctive litho-tectonic assemblages by the northern, central and southern Kunlun sutures which indicated by developing of ophiolite and subduction related volcanic rocks. The northern Kunlun suture is pronounced by the Yazidaban ophiolitic mélangé which consists of serpentites, basalts, diabases and andesites.

The serpentites outcropping at the eastern Yazidaban are characterized by low Σ REE and depletion of mid-REE showing an ophiolitic ultramafic affinity. The basalts overthrusting on the serpentites show low Σ REE and slightly enrichment of LREE, as well as depletion of LILE and insignificant fractionation of HFSE. These geochemical features attributed to E-MORB. Both basalts from the south and central Yazidaban section exhibit similar geochemical compositions to that of the basalt from eastern Yazidaban attributed to E-MORB.

The andesites mainly distributed in the northern Yazidaban section, which possess moderate Σ REE and clear enrichment of LREE, as well as negative Nb-Ta, P and Ti, and positive Th-U anomalies. All these geochemical characteristics represent volcanic rocks associated to a typical island-arc/active continental margin.

The diabases have high SiO_2 content showing basalt-andesitic composition, and are characterized by high Σ REE, strong enrichment of LREE, depletion of Nb-Ta, and significant fractionation of HFSE. These features indicate a subduction related tectonic setting.

All above geochemical constraints on the ultramafic rocks, basalt, suggest an E-MORB tectonic setting, while geochemical features of the andesites and diabases pronounce a subduction related setting. Hence, we explain the Yazidaban mélangé to represent remnants of subduction related volcanic rocks and associated oceanic crust of a back-arc basin. The zircon U-Pb age of a diabase from the northern Yazidaban yields an age of 420.6 ± 3.6 Ma (MSWD = 0.36) representing the time of subduction and formation of back-arc basin.

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