

OCT ophiolite key to the genesis of the podiform chromitites: Case study of Tibetan Dingqing ophiolites

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Ocean-continental transition (OCT) ophiolites are mainly formed in the early stage of Wilson cycle, and composed of mantle peridotites and crustal gabbros, diabase dykes and pillow lavas with minor cherts. The podiform chromitite is a unique mineral resource of ophiolite, but its genesis has been controversial. Previous data revealed that the ore-forming element Cr and its host-rocks originated from the ancient sub-continental lithospheric mantle (SCLM) and created confusions since the ophiolites are traditionally considered that represents the remnant of the nascent oceanic lithosphere in the suture zone. The OCT ophiolite concept may solve this puzzling issue due to its mantle sequences are major oceanization of ancient SCLM peridotites ^[1,2]. We report that most mantle peridotites from Tibetan Dingqing ophiolite are dominantly harzburgite which are highly refractory, containing very magnesian olivine (Fo=90-93) and low 100Al₂O₃/SiO₂ (mostly < 3) orthopyroxene display the characteristics of SCLM in petrography with tabular equigranular texture and kink band in olivines (> 30 km depth) ^[3], and with low Os isotopic composition (low to 0.1180) in geochemistry. While the ultramafic rocks holding both Cr-rich and Al-rich types podiform chromitite intruded in the above-mentioned peridotites, and mainly composed of dunite with high Fo (90.5-92.2) in olivines similar to the magmatic olivines (Fo=90.5-92.6) from the Archean Belingwe komatiites ^[4]. Combined the cumulated pyroxenites have magnesian geochemical affinity reported early in this area, we suggest that the initial magma was possibly komatiitic in nature originated from a plume, produced by the partial melting of the high refractory peridotites at the stage of detachment of the continental lithosphere that formed the Dingqing OCT ophiolite.

[1] Picazo *et al* (2016) *Lithos* 266–67, 233–263.

[2] Huang *et al* (2020) *Lithos*, 370-371: doi.org/10.1016/j.lithos.2020.105612.

[3] Mercier *et al* (1975) *Journal of Petrology* 16(2), 454-487.

[4] Asafov *et al* (2018) *Chemical Geology* 478, 39-59.

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