Widespread PGE depletion in the continental flood basalts of the Early Permian Tarim Large Igneous Province (NW China)

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PGE geochemistry of the Tarim CFBs

The Early Permian Tarim Large Igneous Province (LIP) in the northwestern China consists voluminous continental flood basalts (CFBs) with a residual distribution of over 200,000 square kilometers [1]. The Tarim CFBs can be classified into three groups based on their geochemical distinctions [2]. All of them exhibit extremely depletion of platinum group elements (PGE; ΣPGE < 1 ppb), clearly distinct from many basalts in other LIPs around the world.

Discussion of Results

Such a widespread PGE depletion indicates that the parental magmas of the Tarim CFBs were likely to have been S-saturated before the final eruption and/or there are residual S remaining in the mantle source during its melting. The almost identical PGE depletion in both the more crustal contaminated basalts and the least crustal contaminated basalts suggests that crustal contamination did not trigger the S saturation in the Tarim CFBs. Alternatively, the low-degree (ca. 5%) partial melting of the mantle source of the Tarim LIP may play an important role on the widespread PGE depletion in the Tarim CFBs. The evidence of magma mixing by magma chamber replenishment during the basalt eruptions in the Keping area also indicates secondary S-saturation for the basaltic magmas in the crust, which may cause PGE enrichment in some parts of the magma conduit of the Tarim CFBs [3]. Therefore, it is still possible to discover the magmatic sulfide deposit in the Tarim LIP, which will probably be similar to the Voisey's Bay magmatic sulfide deposit in Canada.

[1] Yang et al. (2013) *Sci. China-Earth Sci.* **56**, 2015-2026. [2] Li et al. (2014) *Lithos* **204**, 47-58. [3] Li et al. (2012) *Chem. Geol.* **328**, 278-289.