

## **Tarim large igneous province correlated to subducted slab-lithospheric mantle-plume interaction**

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The Tarim large igneous province (TLIP) is located in the Tarim Craton in the northwestern part of China. It covers an area of 250, 000 km<sup>2</sup>. In contrast with other LIPs in the world, the TLIP is characterized by a relatively long duration (up to ~30Ma, with sodic, iron-rich melts (mostly corresponding to ferrobasalts), a very complex lithological association and voluminous felsic volcanic rocks (~48,000 km<sup>2</sup>). It contains almost all the lithology in LIP. Except for the common igneous rocks in LIPs, we also recognized some rare igneous rocks, e.g., magnesiocarbonatite dyke, nephelinite lava, kimberlite pipe, lamprophyre-tephrite dyke, nepheline syenite intrusion. Previous field studies and geochronological investigations have identified the sequence of formation of these rocks as: ca. 300 Ma kimberlites→ca. 290 Ma flood basalts and felsic lavas→ca. 280 Ma layered mafic-ultramafic intrusions→270 Ma nephelinite.

Ingrated with the mineralogical, petrological and major, trace element and Sr-Nd-Mg-Zn-O-C isotopic characteristics, we propose that there are two domains of mantle sources for the Tarim mafic-ultramafic magmas: One is lithospheric mantle with the 'iron-rich streaks' that have been resulted from recycled oceanic crusts for basalts, mafic-ultramafic intrusions and diabases. The other one is upwelling plume entraining subducted slabs with magnesite, periclase and perovskite that are recycled sedimentary carbonates (calcite and dolomite) by phase transition at pressure >4.5 GPa for carbonatite, nephelinite and kimberlitic rocks. Thus, the five distinguishing features of the TLIP can be correlated to subducted slab-lithospheric mantle-plume interaction. The long duration of magmatism and iron-rich magma can be attributed to dense eclogite (recycled oceanic crust), and sodic affinity of some alkaline rocks are ascribed to recycled carbonates. The complex lithology is correlated to be resulted from partial melting of different sources or different melting degrees of the same source, whilst voluminous felsic volcanic rocks are produced by hydrous crustal anatexis triggered by underplating basaltic magmas.