

Evidence of mantle diapirism in the Purang diamondiferous ophiolitic peridotites (SW, Tibet)

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The Yarlung Zangbo ophiolites (Tibet) are generally characterized by large-scale exposure of spinel-facies peridotites and minor volume of associated mafic rocks. The finding of diamonds and other UHP mineral phases in some of these massifs raised heated discussion concerning their origin and evolution [1-5]. Previous works have suggested that minor spinel-pyroxene symplectites documented in the Purang peridotites (SW, Tibet) could probably represent the breakdown products of majoritic garnets, with estimated minimum pressures up to ca. 13 GPa [3, 6]. Here, we further show that some well-preserved symplectites in the Purang lherzolites display distinctly high HREE contents and highly fractionated M- to HREE pattern in pyroxenes compared with non-symplectitic pyroxenes, thus confirming a mantle garnet origin. Their host lherzolites have consistent major element, trace element, and Os isotopic compositions supporting derivation from asthenospheric mantle. We suggest that these symplectite-bearing lherzolites provide direct evidence of recent mantle upwelling (or diapirism), which might facilitate fast uplift of the Purang peridotite massif from deeper mantle and preservation of diamond and other UHP phases. Such an interpretation is also consistent with numerical modeling that asthenospheric upwelling in response to oceanic slab retreat could exhume UHP mantle rocks [7].

[1] Yang et al. (2014) *Elements* **10**, 127-130. [2] Yang et al. (2018) *Geochem. Persp. Lett.* **8**, 6-7. [3] Griffin et al. (2016) *J. Petrology*. **57**, 655-684. [4] Griffin et al. (2018) *Geochem. Persp. Lett.* **7**, 1-2. [5] Ballhaus et al. (2017) *Geochem. Persp. Lett.* **5**, 42-46. [6] Gong et al. (2016) *Lithos* **262**, 11-26. [7] Butler and Beaumont (2017) *Earth Planet. Sci. Lett.* **153**, 76-83.