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Platinum-group element and Re-Os geochemistry of lamprophyres in the Zhenyuan gold deposit, Yunnan Province, China: implications for petrogenesis and mantle evolution

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Abstract

Cenozoic lamprophyres are widespread along the Ailaoshan suture, SW Yunnan, SW China, where there are also many important gold deposits, especially the Zhenyuan deposit. We have carried out a geochemical investigation of the Zhenyuan lamprophyres in terms of major and trace elements, platinum-group elements (PGE), and Os isotopes. The Zhenyuan lamprophyres can be classified into groups with high or low Os concentrations. The $^{187}\text{Os}/^{188}\text{Os}$ ratios, corrected for *in situ* growth, are highly variable in both types of lamprophyre, ranging from mantle values up to 1.13. The highly radiogenic Os isotopic signatures are interpreted as being due to long-term accumulation of elevated Re/Os in the lithospheric mantle, as a result of subduction-related metasomatism. The highly variable $^{187}\text{Os}/^{188}\text{Os}$ ratios of the low-Os lamprophyres might also have resulted from metasomatism of a deeply

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