Re-Os isotope geochemistry of picrite from Emeishan LIP, southwestern China: implications for link between ELIP eruption and mantle plume

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There are significant progresses in our understanding of the Emeishan large igneous province (ELIP) of southwest China in recent years. Especially the discovery of picritic lava indicated existence of high temperature primitive magma in the west part of ELIP (Zhang et al., 2002).The comprehensive palaeontological and sedimentological study of the Maokou Formation limestones (MFLs) in 67 sections over the area showed that prior to ELIP eruption, the MFLs in the central part of the ELIP were eroded after being uplifted by several hundred metres to a kilometre (He et al., 2003). The both observations provide strong supports for the link between ELIP eruption and mantle plume. The coupled enrichments of $^{186}Os/^{188}Os$ and $^{187}Os/^{188}Os$ of picrites from LIPs support strongly their origion of mantle plume derived from core-mantle boundary (Brandon and Walker, 2005).

Here we present Re-Os abundances and Os isotopic compositions of 12 picrites and 6 associated basalts collected from Daju and Shiman sections, Lijiang area, west part of ELIP (Zhang et al., 2006) . The results show that the picrites and associated basalts have distinctive Re-Os isotopic characteristic features. The picrites have higher Os abundances (1.5-3ppb) than that of associated basalts (<1ppb), and less lower Re abundance (<0.05ppb) than that of basalts (<0.1ppb). But the picrites have unradiogenic $^{187}Os/^{188}Os$ (0.1260-0.1241) and basalts have supradiogenic $^{187}Os/^{188}Os$ (0.1290-0.1363). All data spreaded near and along reference isochron of 259Ma (ELIP eruption age) in $^{187}Os/^{188}Os$ vs. $^{187}Re/^{188}Os$ plot. The Re-Os isotope geochemistry of ELIP lava may shed light on the mantle plume origin of ELIP. The mantle plume were derived from the asthenosphere rather than the deep core-mantle boundary. Alternatively ELIP euroption was controlled by intereaction between lithosphere and asthenosphere (Saunders, 2005).

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References

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[3] He et al., 2003, EPSL, 213:391-405.