

The origin of Suwan Basalts: constraints from Re-Os and PGE geochemistry

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The origin of the Cenozoic basalts in northern Jiangsu and eastern Anhui (hereafter defined as Suwan basalts) is still under debate. In this study, we first provide Re-Os and PGE constraints for the petrogenesis of the Suwan basalts.

The alkali basalts from Suwan have Os concentration ranging from 38 - 470 ppt and $^{187}\text{Os}/^{188}\text{Os}$ values ranging from 0.1268 - 0.1879; while the tholeiite samples have lower Os concentration ranging from 6 - 143 ppt and higher $^{187}\text{Os}/^{188}\text{Os}$ values ranging from 0.1867 - 0.4820. There is a significant negative correlation between $^{187}\text{Os}/^{188}\text{Os}$ and Os concentration for the tholeiite. It seems that the tholeiite has been significantly affected by lower crustal contamination, probably through an assimilation-fractional crystallization (AFC) process, during magma ascent. On the other hand, un-radiogenic Os isotopes for the alkali basalts with Os concentration higher than 200 ppt, and generally slight P-PGE (Pt, Pd) enrichment relative to I-PGE (Ir, Os, Ru) for the Suwan basalts, suggest a contribution of the subcontinental lithosphere mantle (SCLM).

Combined with major and trace elemental, and Sr-Nd isotopic characteristics, we concluded that the Suwan basalts mainly came from asthenosphere mantle but had a strong interaction with the SCLM.