Magnesium isotopic compositions of Himalayan leucogranites and the Indian lower continental crust

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The lithospheric architecture of the Tibetan Plateau is very complicated, including Indian upper/lower crust, Tibetan upper/lower crust and juvenile lower crust. Before using Mg isotopes to study the evolution of the Tibetan Plateau, it is necessary to determine Mg isotopic compositions of each geological endmember present beneath southern Tibet. Here, we report Mg isotopic data for Himalayan leucogranites and the Indian lower crustal rocks. On the basis of whole-rock major and trace element data and Sr–Nd–Pb isotope data, leucogranites from Luozha, Longzi and Cuona are considered as representative of Indian upper crust, whereas two-mica granites from Quedang and Dala, granulites and gneisses from Nyalam, and hornblendites, pyroxenites, gneisses and granulites from the Namche Barwa area are considered as representative of Indian lower crust.

The δ^{26}Mg values (−0.18‰ to +0.09‰) of Indian upper continental crust display more limited variation compared with the heterogeneous Mg isotopic composition of upper continental crust (−0.52‰ to +0.92‰). On the other hand, the Mg isotopic compositions of Indian lower continental crust (−0.70‰ to +0.06‰) are lighter than those of Indian upper continental crust. The isotopically heavy signature of Indian upper crust may be produced by Mg-rich fluids released from the Indian lower crust slab, whereas the lighter signature of Indian lower crust is generated by the partial melting of residual Indian lower crust slab during metamorphic dehydration of Indian lower crust.

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