Mantle heterogeneity revealed by Hf isotopes of MORB from the Pacific-Antarctic Risecrest (PAR) 53-57°S

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We report Hf isotopic data on mid-ocean ridge basalts (MORB) from the Pacific-Antarctic Risecrest (PAR) at 53-57°S. In the Hf-Nd isotope diagram, the PAR basalts plot predominantly along the Pacific MORB array. Hf isotope correlated well with previously published Sr-Nd-Pb isotopes and with ratios of incompatible trace elements. In addition, some samples have higher ε_{Hf} values at a given ε_{Nd} value, indicating the existence of an extremely depleted component with higher ε_{Hf} values, which might represent residue of ancient melt extraction at the garnet stability depth. The contribution of such depleted refractory materials in the mantle source is relatively limited, and it is easy to be "concealed" due to its extremely depleted nature. Mantle heterogeneity is always considered to be related to the recycled enriched component, however, the depleted refractory materials might also play an important role.

This study is supported by the National Natural Science Foundation of China (No. 41876037).