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Rhenium–Os isotopic systematics of late Cenozoic intraplate basaltic rocks from Korea: implications for recycled slab materials in their mantle source

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We present, for the first time, comprehensive Re-Os isotopic data for 23 late Cenozoic intraplate basaltic rocks from seven locations (Mount Baekdu, Jeongok, Baengnyeong Island, Ganseong, Ullueng Island, Dok Island, and Jeju Island) on the Korean Peninsula. The Re-Os isotopic system serves as an important tracer of processes such as the reworking of old continental lithosphere or the deep crustal recycling. We use these data to investigate the role of the lithospheric mantle, which is currently debated as a source of the basaltic rocks, and to constrain the source lithology. The initial $^{187}Os/^{188}Os$ ratios of the Korean basalts range from 0.1321 to 0.6455, with g_{Os} values of 4.0-408.3. The g_{Os} values do not show a simple correlation with Sr-Nd-Hf-Pb isotope compositions. There are no significant correlations between MgO contents and $^{187}Os/^{188}Os$ ratios or Os contents and $^{187}Os/^{188}Os$ ratios, which demonstrate that crustal assimilation did not produce the supra-chondritic Os isotopic compositions. The g_{Os} values of the Korean basalts are much higher than previously published g_{Os} of spinel peridotite xenoliths (–9.1 to +1.2) hosted in the basalts, indicating the subcontinental lithospheric mantle was not the main source of the basaltic magmatism. The combination of the Os and Sr-Nd-Hf-Pb isotopic compositions suggests that recycled oceanic crust (potentially Pacific oceanic lithosphere), along with pelagic sediments, which possibly reside in the mantle transition zone, is the enriched component with the supra-chondritic Os isotopic composition in the mantle source of the Korean basalts.