# PGE signature of an EM-1 mantle source, evidence from Pitcairn basalts

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The rocks from Pitcairn hotspot are well known to have a strong EM-1 flavor, one of the chemical and isotopic heterogeneities observed in OIB. The likely EM-1 source reservoir identified by radiogenic Sr, unradiogenic Nd, and unradiogenic Pb isotopic compositions compared to those of depleted mantle, has been widely debated. Oceanic crust with pelagic sediment, delaminated subcontinental lithospheric mantle, subducted oceanic plateaus, just single melting process involving pristine mantle and recycled pyroxenites have all been invoked as the EM-1 source. We have measured Os isotope ratios and major and trace element abundances including the PGE in the basalts from Pitcairn Island to elucidate the origin of the EM-1 signature of these basalts.

The Os isotope ratios for the samples with Os > 20 pg/g range from 0.135 to 0.152 without correlation of the degree of the EM-1 flavor (e.g., decreasing of the $^{206}$Pb/$^{204}$Pb and $^{143}$Nd/$^{144}$Nd isotope ratios) and are similar to those of previous studies on EM-1-type basalts (~0.150 for samples with Os > 50 pg/g and ~0.180 with Os > 20 pg/g, [1, 2, 3] ). The Os, Ir and Ru (I-PGE) concentrations of our samples are roughly correlated with MgO and Ni contents and tend to be lower than those of other OIB, such as Hawaii and Canary Islands and a similar range to Louisville seamount [4], but Pd and Re concentration are similar to those for other OIBs. The chondrite-normalized PGE patterns of our samples show no systematic variation with the degree of the EM-1 flavor similar to Os isotope ratios. Since crustal materials normally show large fractionation between I-PGE and P-PGE and the crustal materials have higher Os isotope ratios than mantle, the simple assimilation of crustal materials is not consistent with our data. We carefully try to make an assumption of the initial magma composition to explain the genesis of Pitcairn basalts based on our data combined with previous studies.

[1]Garapic et al. (2015) Lithos 228-229, 1-11. [2] Reisberg et al. (1993) EPSL 120, 149-167. [3] Eisele et al. (2002) EPSL 196, 197-212. [4] Tejada et al. (2015) Geochemist. Geophys. Geosyst. 16-2, 486-504.