Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

Siderophile element heterogeneity of the early mantle: the Western Australia komatiite connection

I.S. PUCHTEL[1], R.W. NICKLAS[1], J. SLAGLE[1], M. LOCMELIS[2], E.G. NISBET[3], R.J. WALKER[1]

[1]University of Maryland, College Park, MD 20742, USA (ipuchtel@umd.edu)
[2]Missouri University of Science and Technology, Rolla, Missouri 65409, USA (locmelism@mst.edu)
[3]Royal Holloway, University of London, Egham TW20 0EX, UK (e.nisbet@es.rhul.ac.uk)

The heterogeneous nature of the mantle in terms of ^{182}W and $^{186,187}Os$ isotopic compositions and highly siderophile element (HSE: Re, Os, Ir, Ru, Pt, and Pd) abundances is now well established based on komatiite research of the past two decades [*e.g.,* 1-4]. However, the origin and longevity of these heterogeneities are still not well understood. This is particularly true for the early Archean mantle, where the variations are largest, yet the available komatiite record is more limited. In this study, we present high-precision Os isotope and HSE abundance data for drill core komatiite samples from the 3.52 Ga Coonterunah, 3.39 Ga Kelly, 3.18 Ga Ruth Well, and 3.15 Ga Regal Formations of the Pilbara Craton in Western Australia. These lavas are unique in many respects; for one, the older, 3.52-3.39 Ga komatiites belong to the Al-undepleted type, typical of the late Archean terrains, whereas the younger, 3.18-3.15 Ga komatiites are of the Al-depleted type, typical of the early Archean terrains. The obtained Re-Os isotope data for the komatiite systems yielded Re-Os isochrons that constrained the radiometric ages of the lavas. The data show moderate to large variations in the initial $\gamma^{187}Os$ values, from +1.3±0.2 to −2.8±0.7 (2SD), indicating that the mantle sources of these komatiite systems evolved with both supra- and strongly sub-chondritic time-integrated Re/Os ratios. Although supra-chondritic time-integrated Re/Os ratios have previously been reported for komatiite systems, the sub-chondritic Re/Os of the Ruth Well komatiites is thus far unique. The calculated HSE abundances in the mantle sources of the four komatiite systems range between ~30 and ~70% of those in estimates for the present-day BSE [5], and, thus, exhibit a ~2× increase in the absolute HSE abundances in the mantle domains sampled by the komatiites over the ~350 Ma of Earth's history. Models for the origin of these HSE heterogeneities will be tested with the forthcoming ^{182}W, $^{142,143}Nd$, and ^{176}Hf isotopic data.

[1] Maier *et al.* 2009, Nature 7255: 620-623; [2] Puchtel *et al.* 2014, GCA 125: 394-413; [3] Puchtel *et al.* 2016, G-cubed 17: 2168-2193; [4] Puchtel *et al.* 2018, GCA 228: 1-26; [5] Becker *et al.* 2006, GCA 70: 4528-4550.