Sluggish equilibration of the Archean mantle with meteoritic late veneer

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The concentrations of highly siderophile elements in Paleo- and Meso-Archean komatiites progressively decrease with age (Fig. 1). These data have been interpreted to result from sluggish equilibration of the Archean mantle with meteoritic late veneer [1]. Relatively low PGE contents were also found by [2] in Barberton komatiites, but the authors argued that there is little systematic secular variation in the calculated composition of the mantle sources to komatiites. Based on Pt-Re-Os isotopic data they instead suggested that low and variable HSE contents in some Archean komatiites are due to fractionation of Pt-alloy and perovskite in a primordial magma ocean. Sluggish mixing of the Archean mantle was also proposed on the basis of elevated $^{182}W/^{184}W$ isotopic compositions of Eo-Archean rocks [3]. This model is consistent with relatively low HSE contents of the rocks, e.g., 5.1 ppb Pt in ultramafic rocks from Nuvvuagittuq [4], and 1-8.6 ppb Pt in Nuvvuagittuq and East Greenland samples [5].

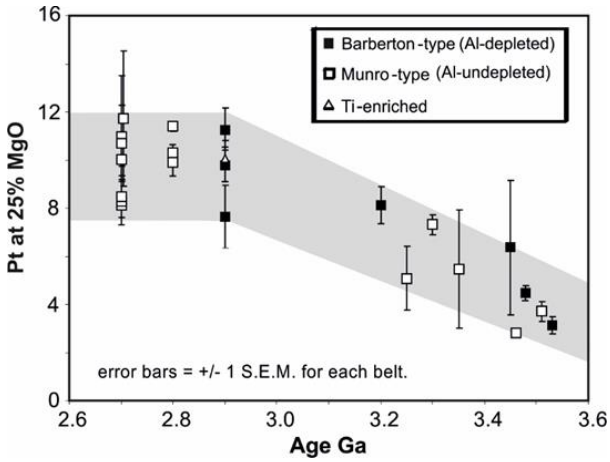

Figure 1: Pt vs age of komatiites (modified from [1].

[1] Maier et al. (2009) Nature **460**, 620-623. [2] Puchtel et al. (2014) *GCA* **125**, 394–413. [3] Willbold et al. (2011) *Nature* **477**, 195–198. [4] Toubol et al. (2014) *ChemGeol* **383,** 63–75. [5] Frank et al. (2016) CMP, DOI 10.1007/s00410-016-1243-y