

Can komatiite PGE abundances trace mixing of the late veneer?

P. WATERTON¹, D.G. PEARSON², B.A. KJARSGAARD³

¹ 1-26 ESB, University of Alberta, Edmonton, AB, Canada. T6G 2E3. waterton@ualberta.ca

² 1-26 ESB, University of Alberta, Edmonton, AB, Canada. T6G 2E3. gdpearso@ualberta.ca

³ Natural Resources Canada, 580 Booth St., Ottawa, ON, Canada. K1A 0E4. bruce.kjarsgaard@canada.ca

Systematic temporal variations in the PGE contents of komatiites have previously been interpreted to represent a slow mixing of late veneer components into the mantle, with mantle PGE concentrations reaching present day levels at ~3.2 – 2.9 Ga [1]. Subsequent studies have challenged this view, and argue for little change in the PGE contents of komatiite sources between ~3.5 – 2.7 Ga [2]. However, both datasets suffer from significant temporal gaps, particularly in the Mesoarchaeon and Proterozoic, which hamper the observation and interpretation of temporal trends in komatiite PGEs.

We present new PGE data from the 1.9 Ga Winnipegosis komatiites (Manitoba, Canada), and preliminary PGE data from the 3.0 Ga Prince Albert komatiites (Nunavut, Canada), with a view to filling crucial gaps in the temporal record of komatiite PGE [1]. Winnipegosis komatiites show Pt concentrations of 6.3 ± 0.5 ppb, corrected to 25 wt% MgO, identical, within uncertainty, to the 3.5 Ga Komati formation komatiites [2]. When the new data is compiled with previous komatiite studies, we find considerable scatter in the corrected Pt contents of komatiites of a given age, and no statistically robust evidence of a temporal trend in komatiite PGEs. However, concentrations of Ir and Os are considerably lower in the Winnipegosis samples than those from Barberton, leading to distinct, more fractionated chondrite-normalised PGE patterns.

In light of recent partitioning studies [3], we discuss controls on the PGE concentrations of komatiitic melts, and demonstrate that differences in the conditions and extent of melting can lead to varying PGE concentrations and relative abundances. This work suggests that komatiite PGE concentrations alone may not provide robust estimates of the PGE abundances of the mantle through time.

[1] Maier *et al.* (2009) *Nature* **460**, 620 – 623.

[2] Puchtel *et al.* (2014) *GCA* **125**, 394 – 413.

[3] Mungall and Brenan (2014) *GCA* **125**, 265 – 289.