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^{182}W variations in Paleo-Archean mafic and felsic rocks from the Barberton Greenstone Belt, South Africa

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Positive ε^{182}W anomalies, caused by the dacay of the shortlived radionuclide ^{182}Hf, are observed in Eo-Archean terranes. This pervasive ^{182}W excess is diminished in Paleo-Archean rocks, due to the progressive homogenization of the mantle [1]. It was originally thought that mantle mixing erased W isotope variations through time, yet negative ε^{182}W anomalies can be found in modern OIBs [2].

The Kaapvaal Craton in South Afrika uniquely features negative ε^{182}W variations in the 3.55 Ga old Schapenburg greenstone remnant [3], while the slightly younger rocks of the 3.45 Ga old Komati formation, show modern mantle ε^{182}W values close to zero. This range of ε^{182}W values in mantle-derived rocks over such a relatively short period of time makes the Kaapvaal craton an ideal location to study the extent of ε^{182}W variations in the Paleo-Archean mantle. We analyzed mafic and felsic samples of the 3.55 to 3.53 Ga- old Sandspruit and Theespruit formations of the Kaapvaal craton, which represent the oldest units of the Barberton Greenstone Belt. Our results indicate a heterogeneous ^{182}W composition, shifting towards negative ε^{182}W anomalies, similar to the results for komatiites of the Schapenburg greenstone remnant [3].

[1] Willbold, M. et al. (2015) EPSL 419, 168–177. [2] Mundl, A. et al.(2017) Science 356, 66–69. [3] Puchtel, I. S. et al. (2016) Geochemistry, Geophysics, Geosystems 17, 2168–2193.

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