Re-Os isotope constraints on the timing and origin of the Giles Complex, South Australia

B.F. SCHAEFER[1] AND B.P. WADE[2]

[1]GEMOC, Earth and Planetary Sciences, Macquarie University, NSW, 2109 Australia (*correspondence: bruce.schaefer@els.mq.edu.au)
[2]Adelaide Microscopy, The University of Adelaide, SA, 5005, Australia. Benjamin.wade@adelaide.edu.au

The Giles Complex of the Musgrave Block, Central Australia comprise a number of discrete layered ultramafic-mafic intrusions of Neoproterozoic age. These intrusives are considered to represent the remnants of a far more extensive Large Igneous Province (LIP), the ~1.08Ga Warakurna Province, which once covered much of central and western Australia [1].

Many LIPs are considered to have been the product of melting due to the impingement of mantle plumes upon the lithosphere, and the interaction between plume derived magmas and the lithospheric mantle is a major control on the composition of the erupted products and their metallogenic potential. Further, the Precambrian record of unambiguously plume derived magmatism is sporadic.

Here we present ^{187}Re-^{187}Os isotopic data for transects across two of the larger cumulate bodies within the province, the Kalka and Gosse Pile intrusions. These bodies are dominantly comprised of pyroxenites and gabbros, with local picrites, websterites and anorthosites.

Initial γOs values are typically close to chondritic, but do range to significantly subchondritic ($\gamma Os_{(i)}$ = -13) with the most evolved being a websterite with ($\gamma Os_{(i)}$ = +8.5). These data contrast with the relatively evolved lithophile isotope signatures recoded in the intrusions ($\varepsilon Nd_{(i)}$ ~ -1 to ~-5), which suggests that either the plume source contained a depleted component which was contaminated by continental crust, or that Nd and Os isotopes are decoupled. A third, highly speculative option, is that the Giles Complex is much younger than previously considered, resulting in higher $\gamma Os_{(i)}$ values, which would suggest a greater crustal input, more in line with Nd isotope constraints.

[1] Wingate, MTD, Pirajno, F and Morris, PA. (2004) *Geology* **32**(2) 105-108.

Southern mid-latitude terminations of MIS-4, the Last Glacial Maximum and the Late Glacial period in the New Zealand moraine record

J.M. SCHAEFER[1]*, M. KAPLAN[1], A. PUTNAM[2], R. FINKEL[3,4], D. BARRELL[5], G. DENTON[5] AND C. SCHLÜCHTER[6]

[1]Lamont Doherty Earth Observatory, Columbia University, Palisades NY 10964 (*correspondence: schaefer@ldeo.columbia.edu),
[5]Dept of Earth Science, University of Maine, Orono ME 04469 (gdenton@maine.edu),
[3]Earth and Planetary Science Dept., University of California, Berkelely, CA 94720, USA,
[4]CEREGE, 13545 Aix-en-Provence Cedex 4, France
[5]GNS Science, Dunedin 9054, New Zealand (d.barrell@gns.cri.nz),
[6]Institut für Geologie, Universität Bern, 3012 Bern, Switzerland (schluech@geo.unibe.ch),

Moraines provide a near-global climate record, but precise dating has been difficult. Southern hemisphere records are of particular potential due to northern bias of climate archives and the presence of some of the best-preserved and resolved moraine records. Based on a new atlas of geomorphologic maps and an extensive and precise cosmogenic ^{10}Be chronology we present a comprehensive termination record from New Zealand's Southern Alps spanning the last 70 kyr. Our data provide evidence that

(i) the Marine-Isotope-Stage (MIS)-4 glaciation in New Zealand was as extensive as the Last Glacial Maximum (LGM) and its termination coincided with the onset of sealevel rise during the MIS-4/3 transition,

(ii) the LGM in New Zealand lasted for more than 15 ky and terminated near-synchronously on both hemispheres,

(iii) the deglaciation was interrupted by a prominent late glacial advance that terminated around 13 ky ago, consistent in timing with the Antarctic Cold Reversal.