

## **Global dynamics 3Ga ago – Hf isotopes in black shales from Pilbara craton support change**

YONA NEBEL-JACOBSEN<sup>1</sup>, OLIVER NEBEL<sup>1</sup>, MARTIN WILLE<sup>2</sup>

<sup>1</sup> SEAE, Monash University, Melbourne, Australia, (\*correspondence: yona.nebel-jacobsen@monash.edu.au)

<sup>2</sup> Isotope Geochemistry Group, University of Tuebingen, Germany

Recent studies [1,2] show a significant change in the geochemistry and petrology of rock series at the Archean-Proterozoic transition. This change has been linked to the onset of modern-style subduction and plate tectonics. However, a key problem in assessing crustal evolution is the sparse rock record of the Archean, with only ca. 7 % of today's accessible crust being older than 2.5 Ga [3]. Analyses of ancient sediments derived from these early crustal assemblages may be used to circumvent this issue. In the past, zircon has been a key mineral in such investigations. Zircon itself, however, may be a biased archive, as it preferentially forms in felsic melts. Using a 'soft-dissolution' method [4], we investigated Hf isotopes a series of four Archean black shales from the Pilbara craton with known ages between 3.5 and 2.7 Ga, the presumed time of changes in global geodynamics, in search for changes in the non-zircon sedimentary record.

Initial  $\epsilon_{\text{Hf}}$  from  $<3\text{Ga}$  samples lie between -5.2 and -0.2, indicating evolved crustal domains in their provenance. The values of the  $>3\text{Ga}$  samples, however, show significantly higher initial Hf isotopic compositions. Crustal formation Hf model ages indicate a common provenance. We therefore conclude that the source regions of the black shales i.e., the greater Pilbara craton, changed from predominantly juvenile magmatism towards intra-crustal reworking around 3Ga ago.

[1] Dhuime et al. 2012, Science, Vol 335, 1334-1336 [2] Keller & Schoene 2012, Nature Vol. 485, 490-493 [3] Hawkesworth et al. 2010, J. of the Geol. Society Vol. 167, 229-248 [4] Lagos et al. 2007 Chem.Geol, 243, 16-32.