

Volcanism in South Africa and Australia during BIF deposition in the Paleoproterozoic

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Context

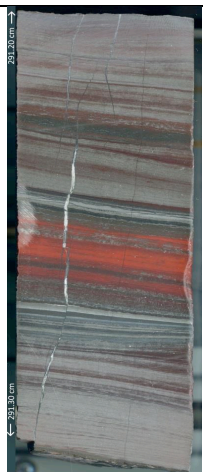
The Paleoproterozoic banded Iron Formations in the Hamersley Basin of Australia and the Transvaal Supergroup of South Africa are both interbedded with numerous stilpnomelane lutite layers that are interpreted as volcanic ash fall deposits. The terrestrial influx into these basins is very low and therefore these ashes may represent an important chemical component of the system. The geological setting from which these ashes originated is not known, nor their likely origin, both of which may have important implications for Archean plate tectonic processes. Unfortunately, most of the primary mineralogy of these ashes has been lost due to post-emplacement alteration or dissolution re-precipitation reactions occurring during the passage of the ash through the water column. However, tiny zircon crystals are robust to these processes and have survived some of the alteration. This project involves studying these zircon crystals to investigate their origin. This is a collaborative project with a research group at Utrecht University.

Objectives and Methods

The planned work will start on a suite of lutite layers already collected during fieldwork in South Africa. Zircon will be separated from these layers, imaged and analysed for Hf isotopes, trace elements and U-Pb ages through Laser Ablation ICP-MS. These results will be compared with published datasets for zircons from South African cratons, and also the same will be conducted on Australian samples (time permitting). Further sampling trips may be necessary depending on the initial outcomes.

Literature

Pickard A.L., (2003) SHRIMP U–Pb zircon ages for the Palaeoproterozoic Kuruman Iron Formation, Northern Cape Province, South Africa: evidence for simultaneous BIF deposition on Kaapvaal and Pilbara Cratons. *Precamb. Res.* 125, 275-315; Pickard A.L., (2002) SHRIMP U–Pb zircon ages of tuffaceous mudrocks in the Brockman Iron Formation of the Hamersley Range, Western Australia. *Australian Journal of Earth Science* 49, 491-507.



Websites to visit :

http://cms.unige.ch/sciences/terre/research/Groups/isotope_geology/isotope%20group.php
http://cms.unige.ch/sciences/terre/people/personal_pages/UrsSchaltegger/UrsSchaltegger
<https://www.uu.nl/staff/PRDMason/0>

Choice of orientation and modules:

Orientation GATO (Geochemistry, Alpine tectonics and Ore Deposits); Modules: Isotope Geochemistry, Analytical Toolbox, Magmatic Petrology.