



## **The analysis of a hydrothermal breccia system, Mount Painter Inlier, South Australia**

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A large hydrothermal breccia system is located in the Mt. Painter Inlier (South Australia), which is a small Mesoproterozoic basement block composed of metamorphics, as well as deformed and undeformed granitoids. The Mt. Painter Inlier and surrounding Adelaidean Sequence rocks underwent folding, faulting and associated metamorphism during the ~500 Ma Delamerian Orogeny. The first and major magmatic-hydrothermal event was dated at about 440 Ma (Elburg et al., 2003). It involved several stages of alteration and brecciation:

- 1) Intrusion of S- and I-type granite and associated pegmatites.
- 2) Extensive K-feldspar alteration of all lithologies, resulting in a granite-like feldspar-quartz rock.
- 3) Localisation of fluid flow to form extensive feldspar-rich and/or chlorite-alteration breccia zones.
- 4) Formation of uranium-bearing magnetite/haematite breccia bodies. Uranium precipitation is probably related to the oxidation of magnetite to haematite.

The area cooled down to ca. 170°C at about 310 Ma (U/Th-He age) and subsequently a second, near-surface hydrothermal event overprinted and reworked the older breccia and alteration zones. It involved remobilisation of haematite, extensive quartz precipitation and the partial removal of uranium. An age of about 220 Ma was obtained by Rb/Sr dating of associated quartz and fluorite.

Detailed mapping and hyperspectral analyses show that fluids followed pre-existing structures, such as pre-Delamerian and Delamerian foliation, folds and faults, even though most of these faults appear not to have been active during hydrothermal activity.

Elburg, M.A., Bons, P.D., Foden, J. and Brugger, J. (2003): A new defined Late Ordovician magmatic-thermal event in the Mt Painter Province, Northern Flinders Ranges, South Australia, *Australian Journal of Earth Sciences*, 50:611-631