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Preliminary results of a structural and geochemical analysis of a hydrothermal breccia system, Mount Painter Inlier, South Australia

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In the southern part of the Mesoproterozoic Mt. Painter Inlier (South Australia) extensive fluid flow during the Paleozoic altered and brecciated basement metamorphic rocks in an area of ca. 60km^2. Pelitic and psammitic metasediments as well as metagranitoids and mafic rocks are incorporated within this extensive hydrothermal breccia system. Overlying Neoproterozoic Adelaidean succession sediments are affected to a lesser extent.

After the last deformation event, the ca. 500Ma thick skinned Delamerean Orogeny, K-rich melts and fluids entered the uplifting system. The fluid flow was driven by the intrusion of granitic and pegmatitic bodies at about 440Ma (Elburg et al, 2003), which were focused along the hinge zone of a 10-20 km wide Delamerean anticline. Other pre-existing structures such as foliation and faults acted also as fluid pathways and led to a concentration of alteration and brecciation in the centre of the southern basement block.

Petrological and geochemical analysis of host rocks and alteration products show variation in the K/Na ratio with development of the fluid system. Extensive K ($\pm$Na) metasomatism produced a pink granite-like microcline ($\pm$albite) - quartz rock out of every available protolith. This metasomatism was associated with alteration of pre-existing feldspars and biotite. Breakdown of biotite released additional fluid, which probably played a role in the extensive brecciation. Released iron was concentrated in magnetite sheets along redox horizons. Martite-mushketovite indicate that the system crossed the magnetite-hematite buffer, probably during exhumation and cooling of the system. Oxidation of the iron-deposits was associated with the formation of uranium deposits.

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