GEOCHEMICAL SIGNATURE OF ZIRCON IN RELATION TO MINERAL SYSTEMS

PHD PROJECT

University of South Australia

PRIMARY SUPERVISOR

A/Prof Caroline Tiddy
e: caroline.tiddy@unisa.edu.au
t: +61 8 8302 5272

CO-SUPERVISORS

Prof. David Giles (UniSA), Dr Diana Plavsa (University of Adelaide), Mr Adrian Fabris (GSSA)

PARTICIPATING ORGANISATIONS

University of South Australia

Government of South Australia
Department for Energy and Mining

RESEARCH PROJECT

The challenge for mineral exploration is to meet increasing global metal demand by making new discoveries. This challenge is amplified by decreasing rates of deposit discovery, as ore deposits once exposed at the Earth's surface are being depleted. This has shifted the exploration frontier into progressively deeper terranes at increased cost and risk, increasing the need for indirect indicators of mineralisation.

Resistate mineral phases (e.g. monazite, rutile) demonstrably preserve unique geochemical signatures that can be directly related to mineralisation, and have the potential to be incorporated into sedimentary cover without undergoing alteration. Once characterised, these signatures have the potential to be used to identify buried mineralisation. This project aims to develop geochemical criteria for exploration using zircon chemistry. Mineral and whole rock geochemical data will be collected on zircon grains known to be associated with a mineralised system to identify unique chemical signatures that may be associated with various commodities, and understand their relationship with geological processes and provenance. This will be combined with assessment of the palaeogeography and landscape processes active at the time of deposition of sedimentary cover to understand the potential effect of weathering and transport and how the geochemical footprint of underlying mineralisation can be increased through the cover.

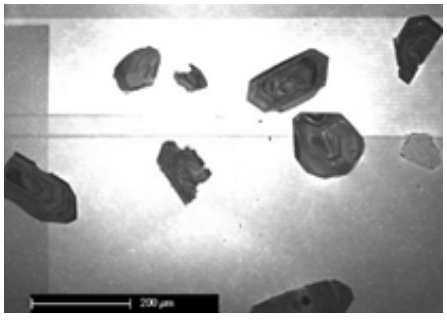

Figure: *Cathodeluminesence images of zircon grains from the Donington Suite at Punt Hill, Gawler Craton, South Australia.*