

APPLICATION OF ARGON GEOCHRONOLOGY TO CONSTRAIN SHEAR ZONE MOVEMENT AND EXHUMATION OF THE NORTHERN AND EASTERN MARGINS OF THE WEST AUSTRALIAN CRATON

MINEX CRC PROGRAM 3

National Drilling Initiative

MASTERS PROJECT

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RESEARCH PROJECT

Aims:

(a) A transect of argon geochronology and T-t or P-t data for WA NDI regions;

(b) Improved understanding of the geological history of two NDI regions, to feed into NDI drilling programs and synthesis of the geological evolution;

(c) Improved understanding of the assembly of a large part of the Australian continent.

Developments in argon geochronology have provided insight into the high- and low-temperature movement history of major continental-scale movement zones, as part of the National Drilling Initiative (NDI) component of the national-scale MinEx CRC project. These movement zones may extend over hundreds of kilometers as the continental architecture of Australia was assembled and reworked.

The remit of the NDI is to promote mineral exploration in greenfields regions of Australia. As such major shear zones may represent major mineralising fluid conduits it is thus within the remit of the NDI and Min Ex CRC to understand the timing of movement history of these zones.

This research will fill a critical gap in our knowledge. The Far East Yilgarn and Paterson Orogen are two of three NDI 'Gap' areas in Western Australia, covered by the Neoproterozoic and more recent developed Officer, Canning, Eucla and Bight Basins. A critical part of understanding the geology involves understanding the geological history of the margins, as these are mostly greenfields themselves. Age constraints on the timing of shear zone movement and exhumation are poorly constrained, making it difficult to understand how this complex craton margin evolved, and the age of movement is important if we are to understand the controls and time lines of mineralisation as well as basin evolution.