

Thermal and exhumation history of
the central Yorke Peninsula, southern
Gawler Craton

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THERMAL AND EXHUMATION HISTORY OF CENTRAL YORKE PENINSULA

ABSTRACT

The central Yorke Peninsula, South Australia, is a prospective area for iron-oxide-copper-gold mineralisation. However due to minimal exposure there is limited data on the metamorphic, deformation and cooling history on the Central Yorke Peninsula in southern Gawler Craton in southern Australia.

Here we use metamorphic zircon and monazite grains from drill holes in the Equis and Ranald prospects to determine the thermal history of the area. U-Pb geochronology suggests that central Yorke Peninsula underwent metamorphism during ca 1540 – 1480 Ma. Pressure – temperature (P-T) modelling suggests that the metamorphic conditions for this thermal event were high temperature/low pressure, amphibolite-granulite facies associated with normal to elevated geothermal gradients. The tectonothermal driver for this event is not clear, it can be suggested that a combination of extension and magmatism may have contributed to this thermal event. After the thermal event the central Yorke Peninsula underwent a period of extension and exhumation.

Exhumation and extension was most likely accommodated by the Pine Point Fault during ca 1500 – 1450 Ma and was likely to be associated with reactivation of major structures, brittle faulting and regional folding in the Gawler Craton.

Ca 1600 – 1570 Ma Hiltaba-age mineralisation has possibly been affected by the ca 1540 to 1480 thermal event in ways of remobilisation and concentration and following that was possibly redistributed along the Pine Point Fault during the ca 1500 – 1450 Ma extension and exhumation.

KEYWORDS

Tectonothermal history
MnNCKFMASHTO
Yorke Peninsula
Gawler Craton
Monazite
Metamorphic
Proterozoic

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