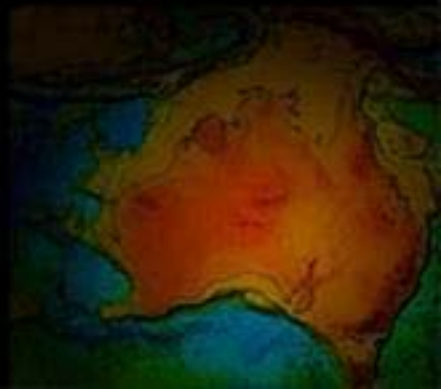




Australian Government
Geoscience Australia

THE TARCOOLA GOLDFIELD

Anthony Budd
Gawler State of Play 2004

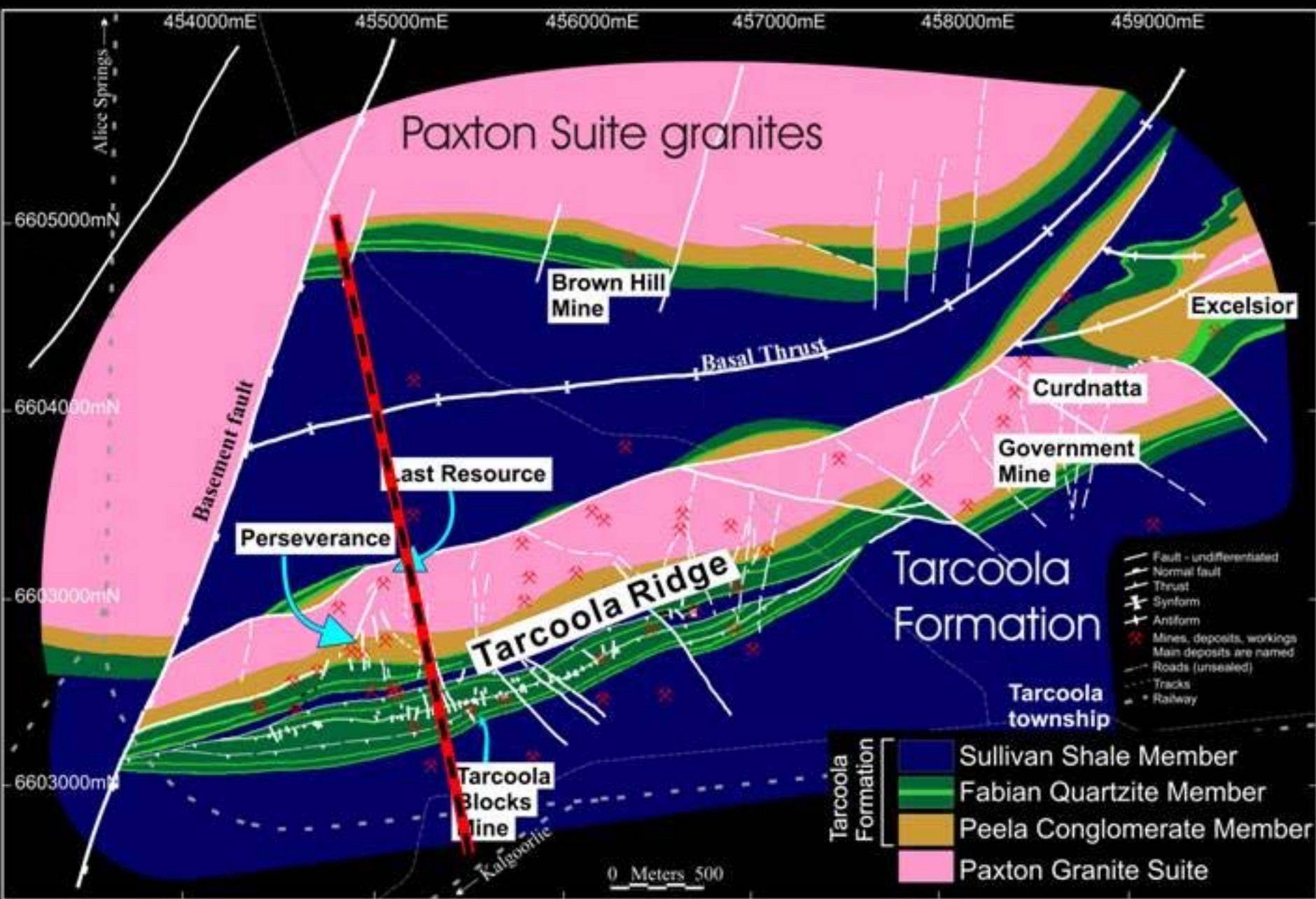


The Tarcoola Goldfield

- Background to PhD project
- Geology & geochronology
- Alteration & mineralisation
- Nd isotopes
- Fluid inclusions
- Summary

Thanks to Euro, Gravity Capital & Anglogold





After AngloGold & Gravity Capital

S

0 300 600 900
METRES

N

Railway

Tarcoola
Blocks
mine

Tarcoola Ridge

Main Slide Fault

Perseverance
deposit

Basal Thrust

Browns Hill

Lady
Jane
Diorite
dykesFelsic granite
dykes & sillsSullivan
Shale
MemberSullivan Shale /
Fabian QuartziteFabian
Quartzite
MemberPeela
Conglomerate
Member

Paxton Suite

Geochronology of the Paxton Suite

- **Granodiorite**
 1718.6 ± 2.9 Ma
- **Granite**
 1722.3 ± 3.9 Ma
- **Felsic granite**
 1715.1 ± 3.2 Ma



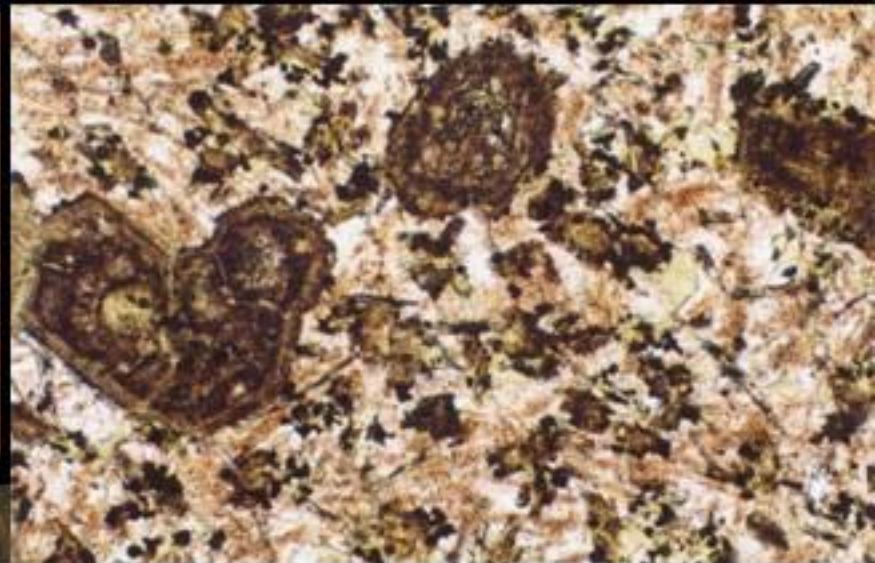
Tarcoola Formation

- Sullivan Shale Member
 - Fabian Quartzite Member
 - Peela Conglomerate Member
- Depositional age
 1656 ± 7 Ma
- 1715.0 ± 5.9 , 1732.8 ± 5.1 Ma (Holm)



Lady Jane Diorite

- High-K amygdular microdiorite
- Tens of cm to several meters wide



Ar-Ar
1580 Ma



Alteration of the Paxton granite



Unaltered



Hm-Mgt



Ser-(Qtz)-Py
273 ppb Au



52 g/t Au

Gain:

Au, Pb, Zn,
As
Rb, V
CO₂, H₂O,
SO₃
Fe³⁺, K₂O

Loss:

Na, Sr, Ba
Magnetite
Fe²⁺

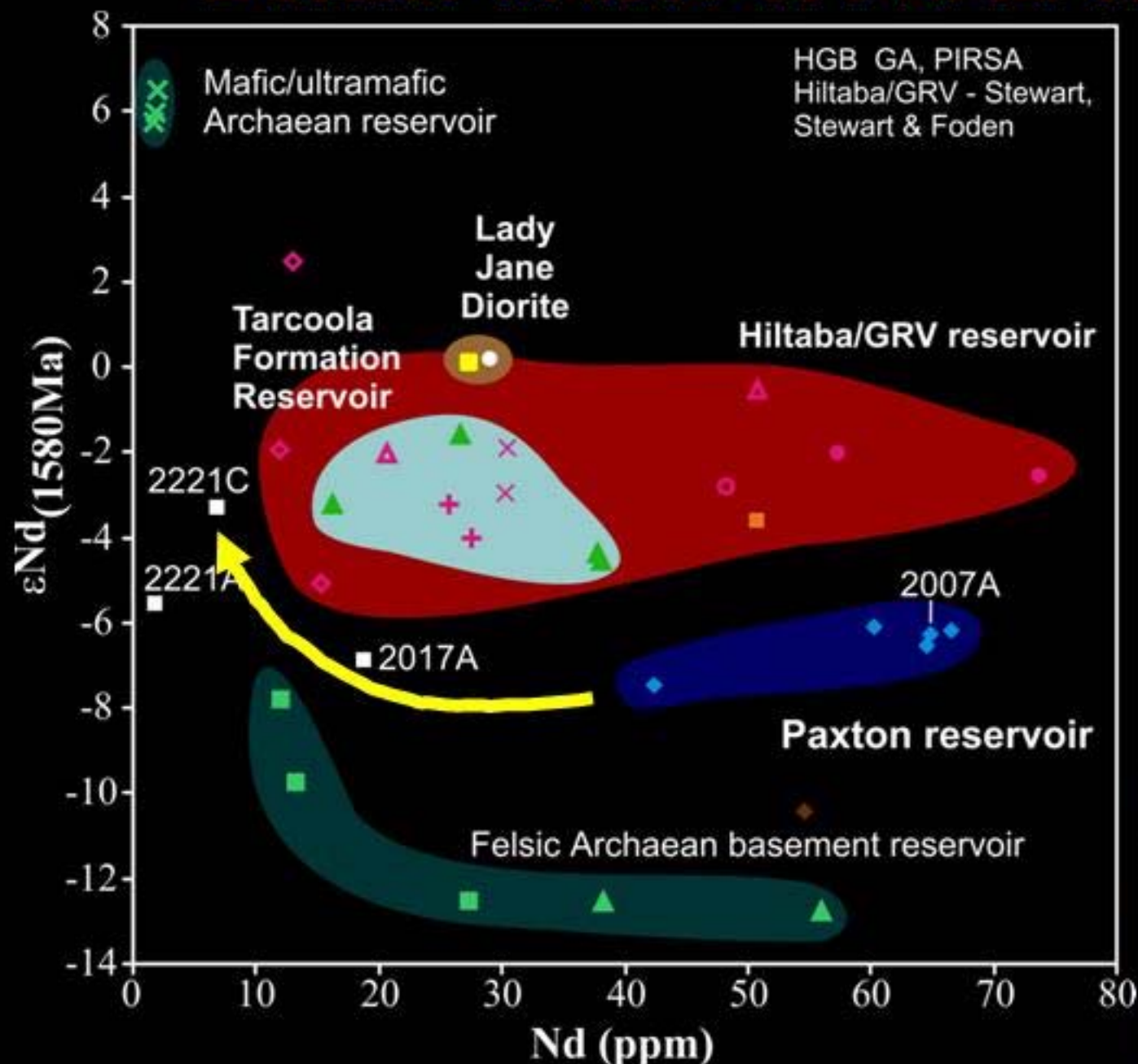


Mineralisation

- Au + Pyrite $\pm$ Galena + Sphalerite in quartz veins
- Fracturing is main control
- Negligible Bi, W, Mo, Sb, Cu
- One mineralising event; no separation of Au & base metals

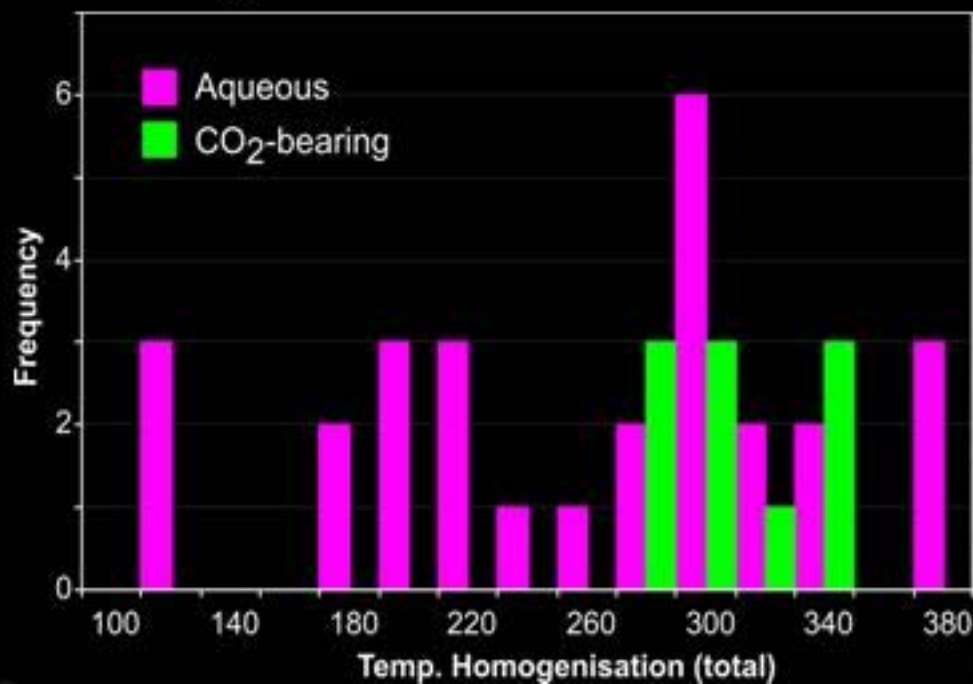


Diorite source of Nd in ore?



Fluid Inclusions

- Quartz veins associated with sulfide, Au
- 2 main types: aqueous & $\text{H}_2\text{O}+\text{CO}_2\pm\text{CH}_4$
- <10 wt% NaCl eq. KCl, CaCl_2 , MgCl_2
- $\text{H}_2\text{O}^l+\text{CO}_2^v+\text{CO}_2^l$ indicate high density
- $T_H \sim 350-180^\circ\text{C}$



Conclusions - CGGP

- Same alteration, different metal content
- Tarcoola does not conform well to intrusion-related gold model
 - Hiltaba granites oxidised
 - Lacks graniteophile elements
- Lode-gold style?
 - Nd consistent with Hiltaba/GRV input
- Role of mafic/intermediate magmas?

