



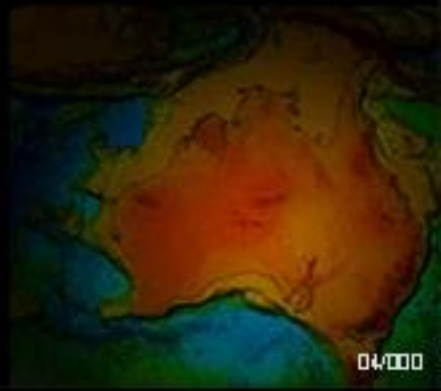
Australian Government
Geoscience Australia



**Research School
of Earth Sciences**

NEW GEOCHRONOLOGY OF THE MOUNT WOODS INLIER & CENTRAL GAWLER GOLD PROVINCE

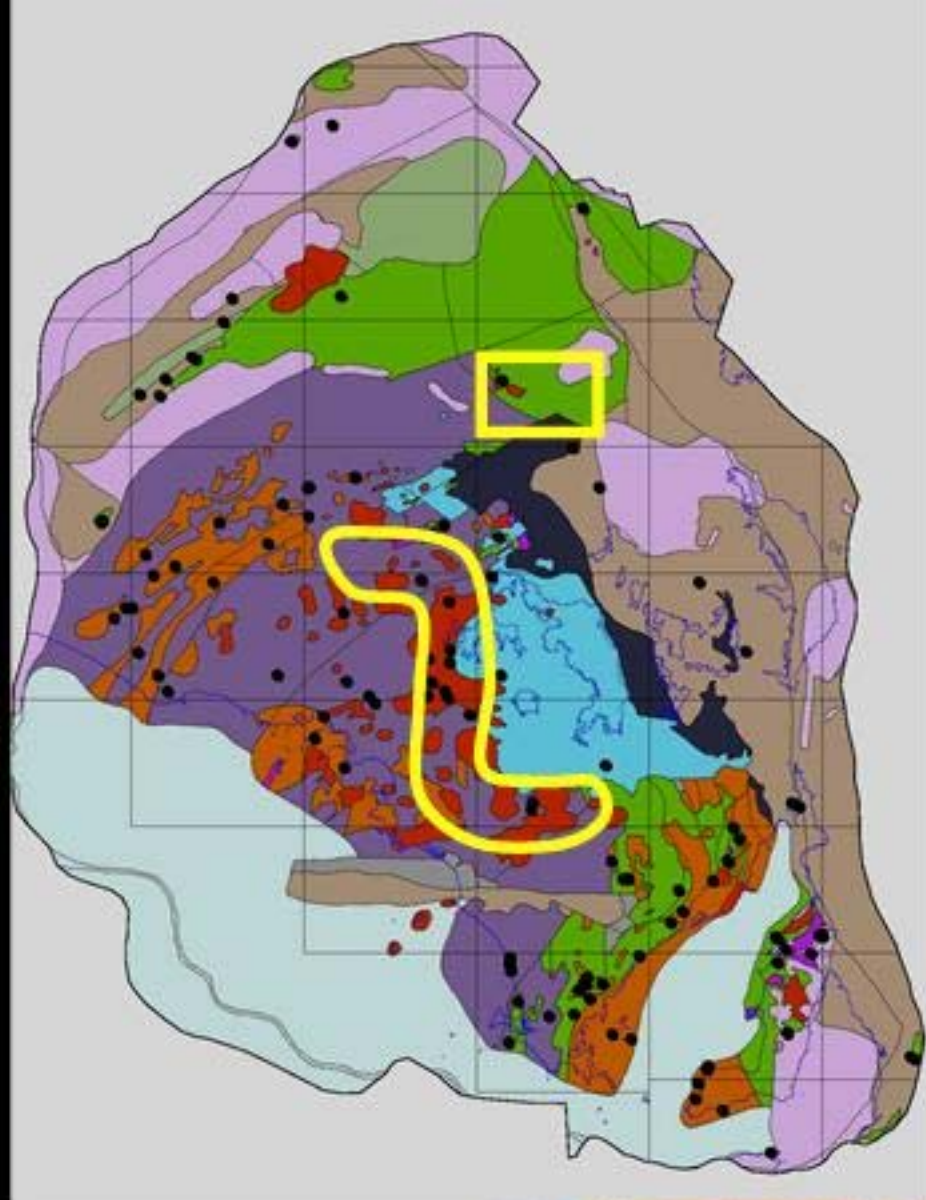
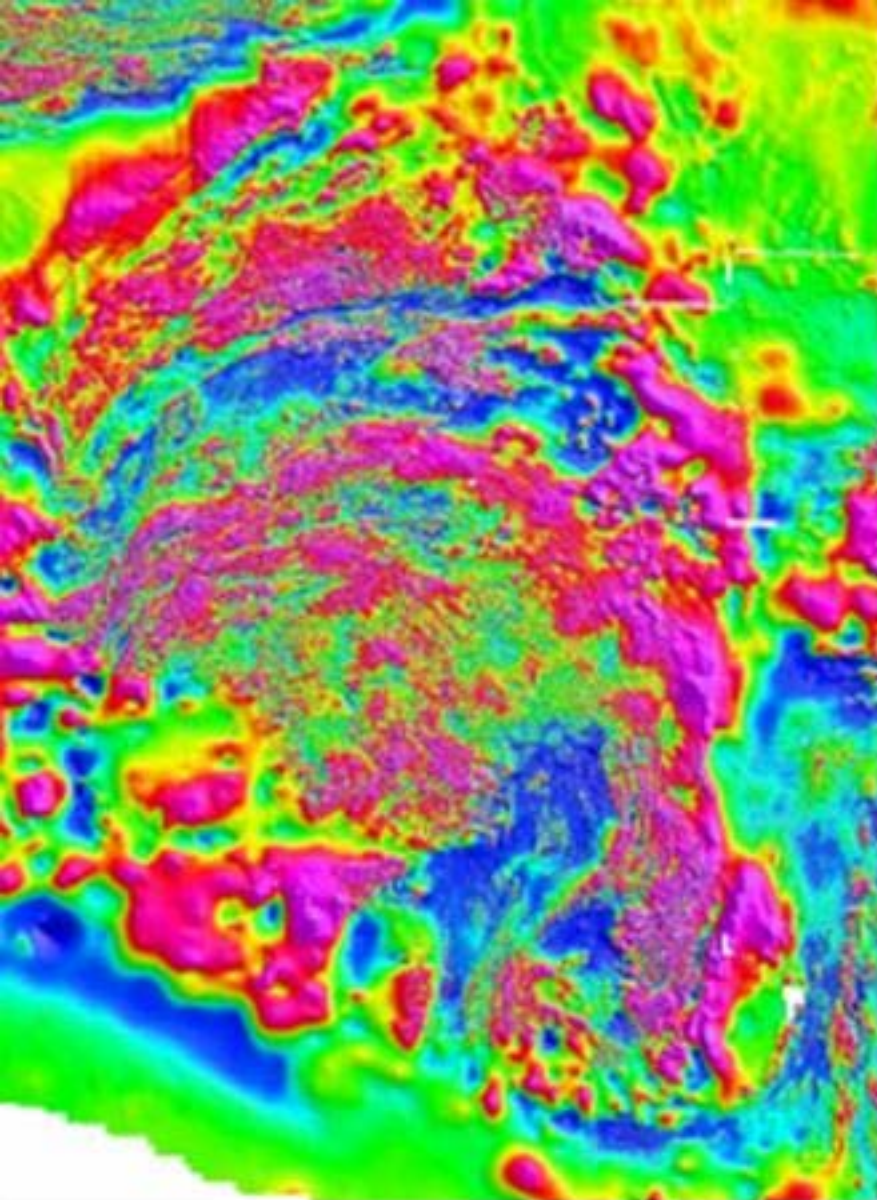
Oliver Holm



Outline

- **Geochronology Overview**
- **Research aims**
- **New U-Pb SHRIMP geochronology results**
- **Conclusions**
- **Future directions**





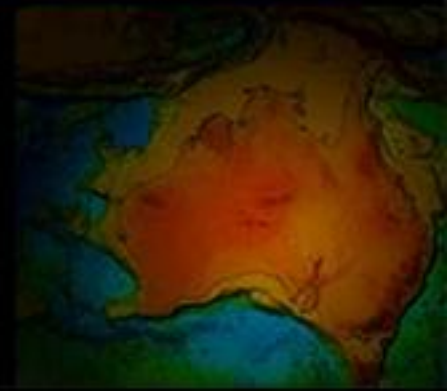
August 2004 - Gawler State of Play



Mt Woods Inlier

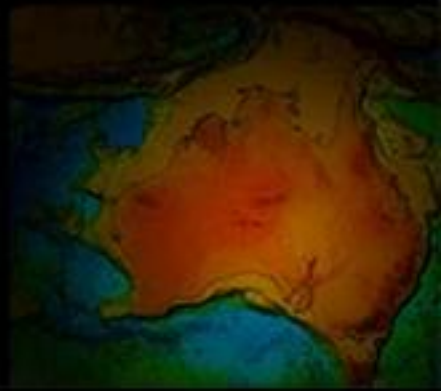


August 2004 - Gawler State of Play



Research aims

- Refine the timing of magmatism
- Better understand event systems
- Devise a tectonic framework
- How do the known mineral systems fit into an event context?



(Daly et al. 2001)

Mt Woods
Metamorphics
 1736 ± 14 Ma

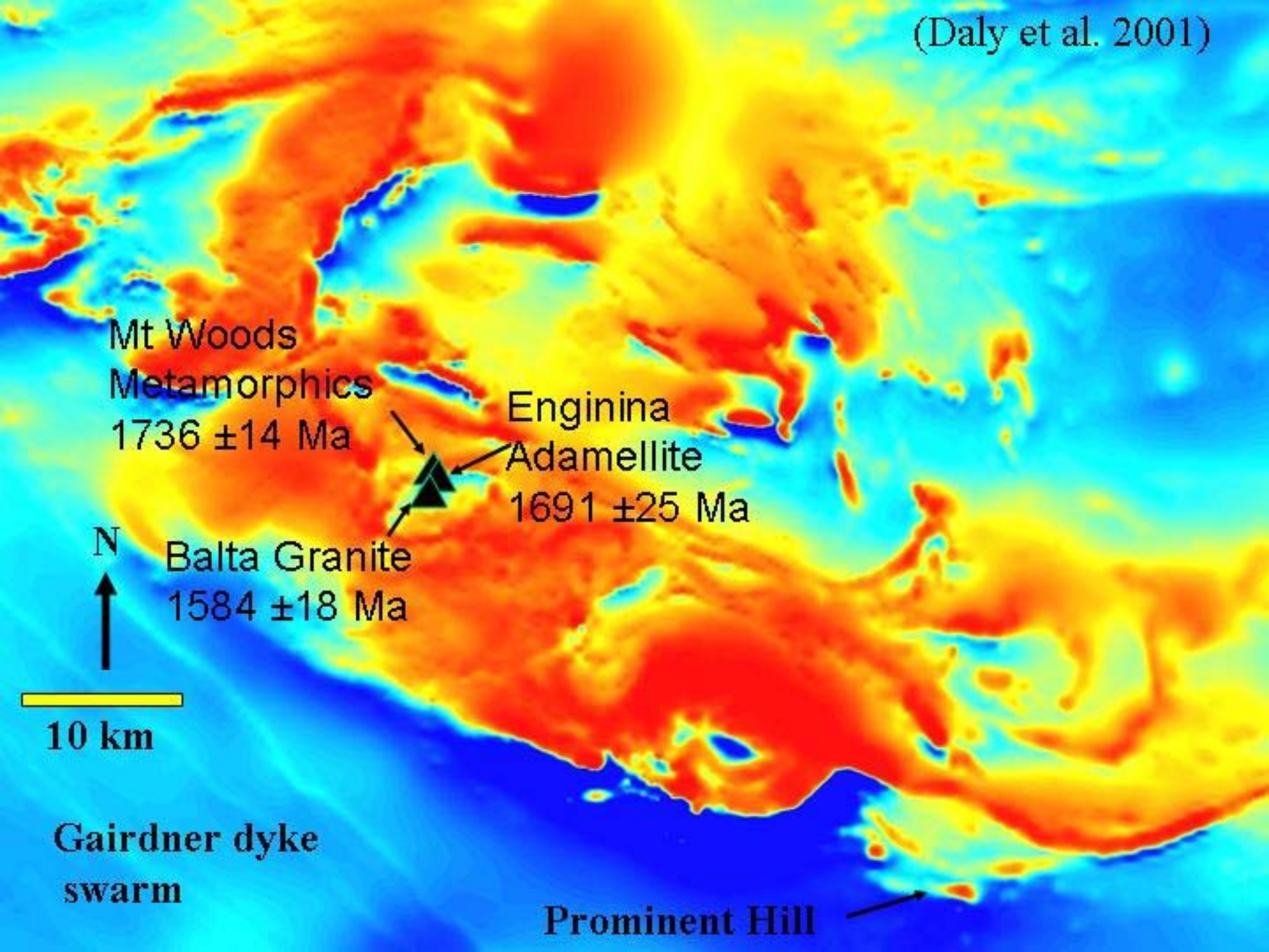
Enginina
Adamellite
 1691 ± 25 Ma

N
↑
Balta Granite
 1584 ± 18 Ma

10 km

Gairdner dyke
swarm

Prominent Hill



GNEISS
 1587 ± 2 Ma

GRANITE
 1708.1 ± 2.9 Ma

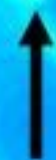
GABBRO 
 1589.3 ± 4.5 Ma

GRANITE
 1591 ± 5 Ma

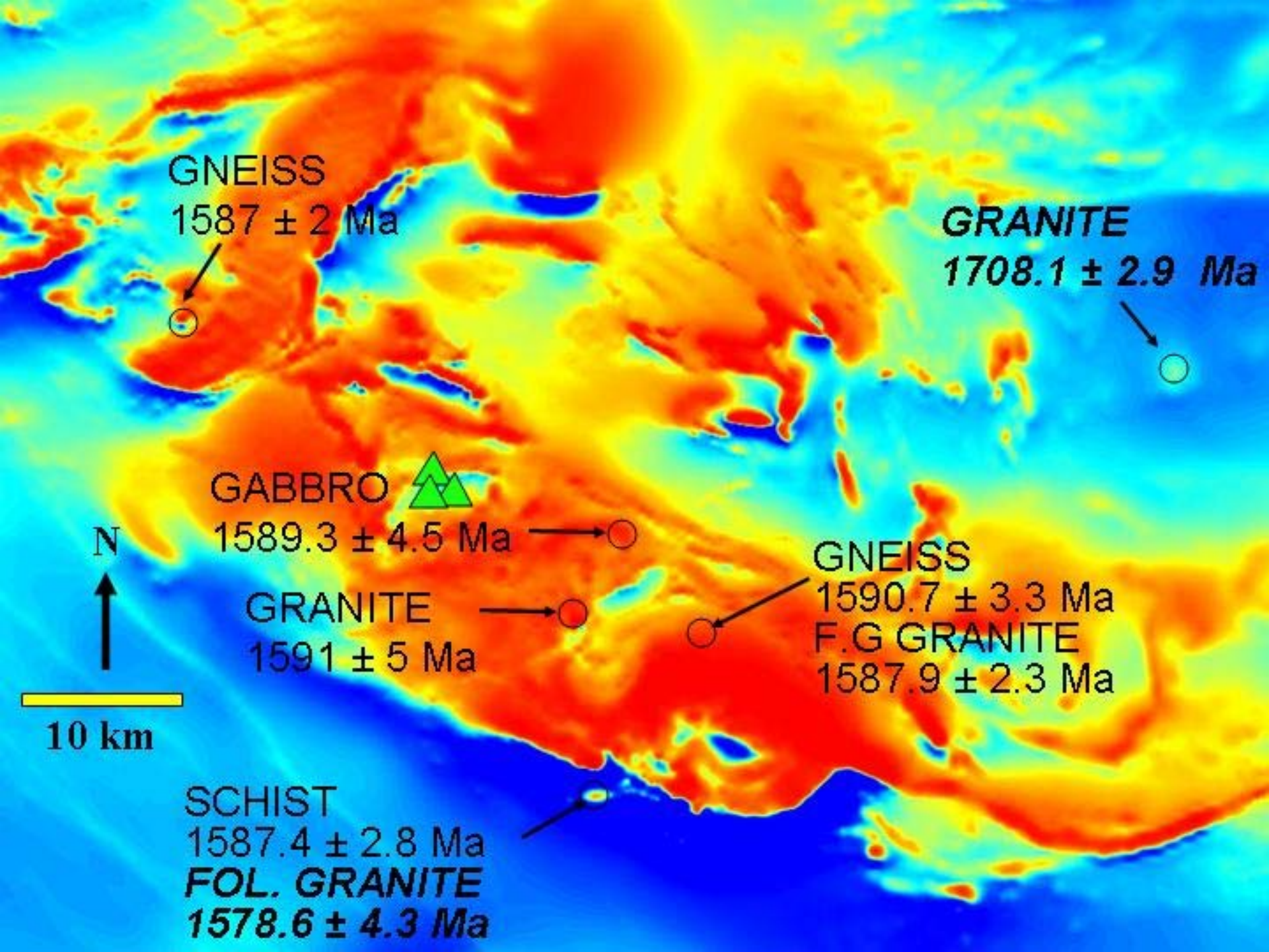
GNEISS
 1590.7 ± 3.3 Ma
F.G GRANITE
 1587.9 ± 2.3 Ma

SCHIST
 1587.4 ± 2.8 Ma
FOL. GRANITE
 1578.6 ± 4.3 Ma

N



10 km



2003362517

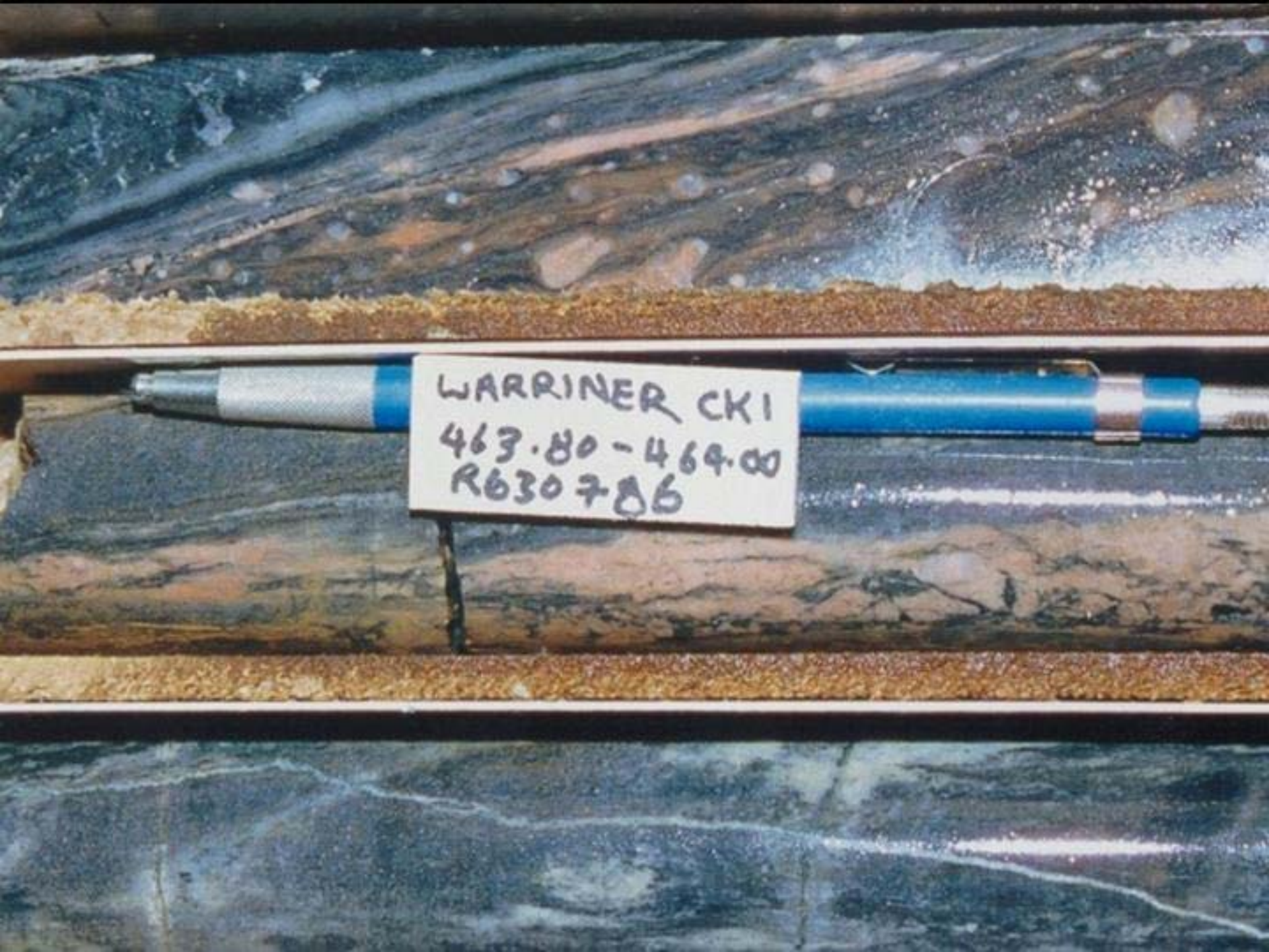
Warriner Ck 1

granite



WARRINER CK 1
418.00-418.10
R430781





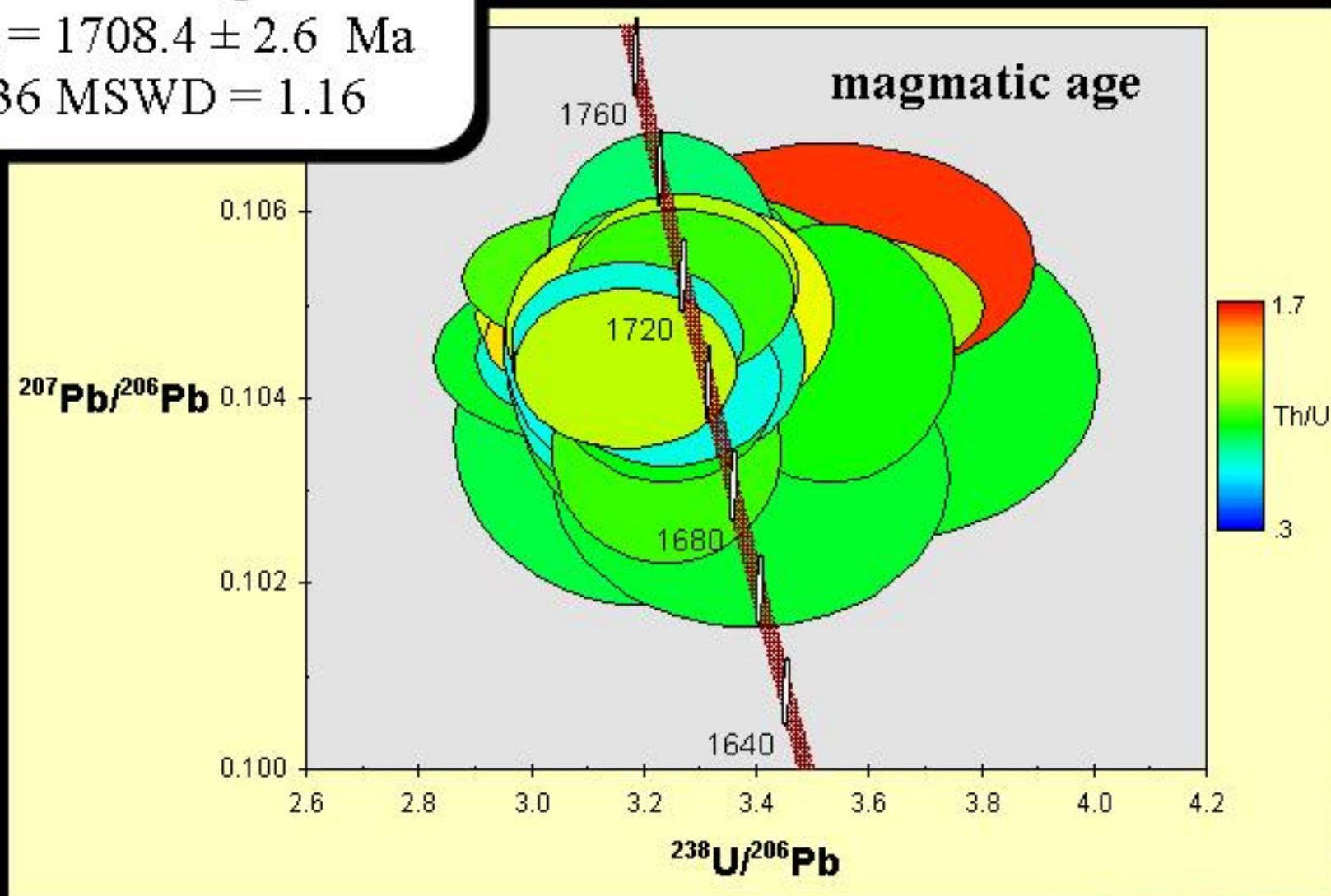
WARRINER CK1
463.80-464.00
R630786

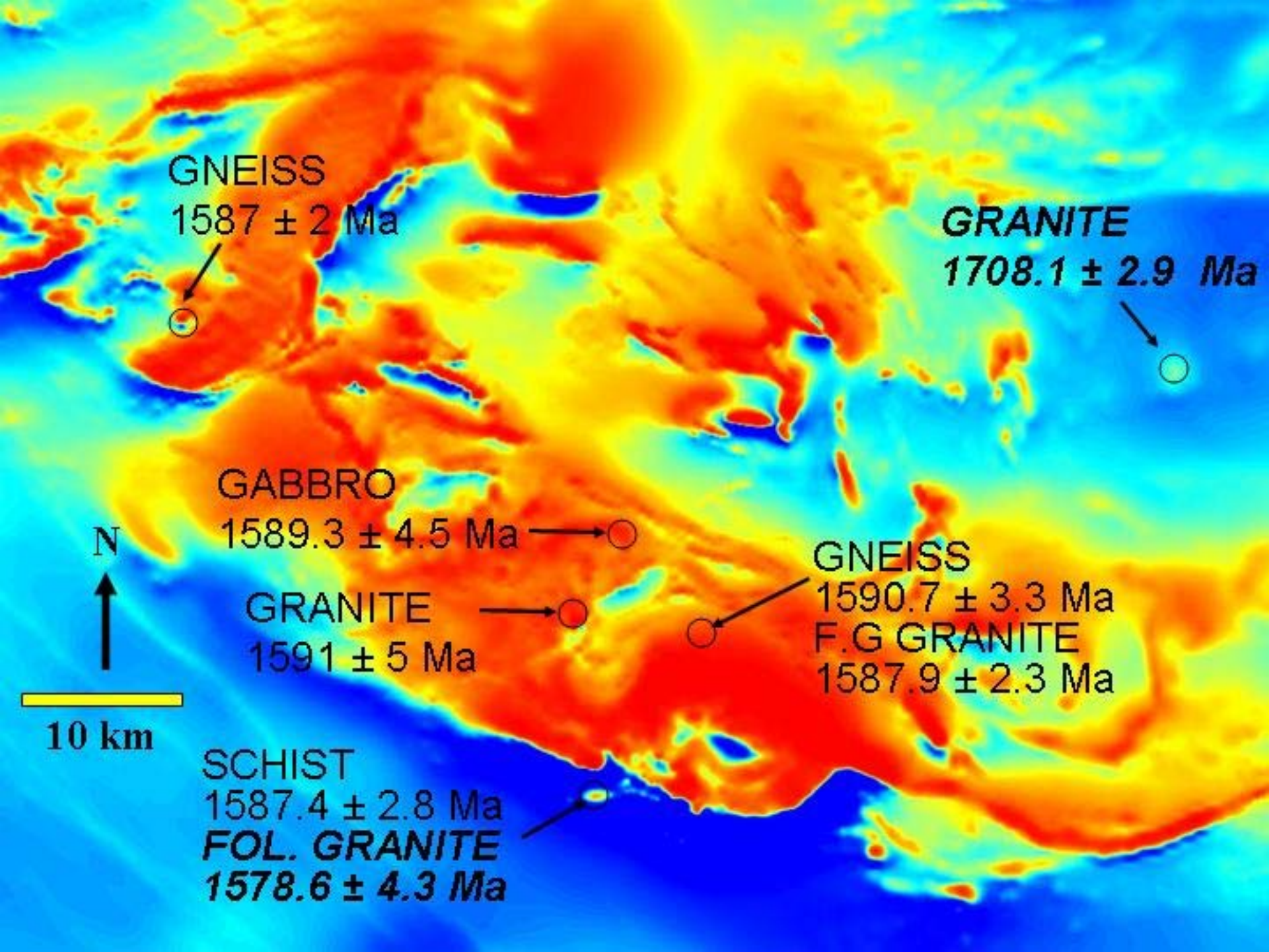
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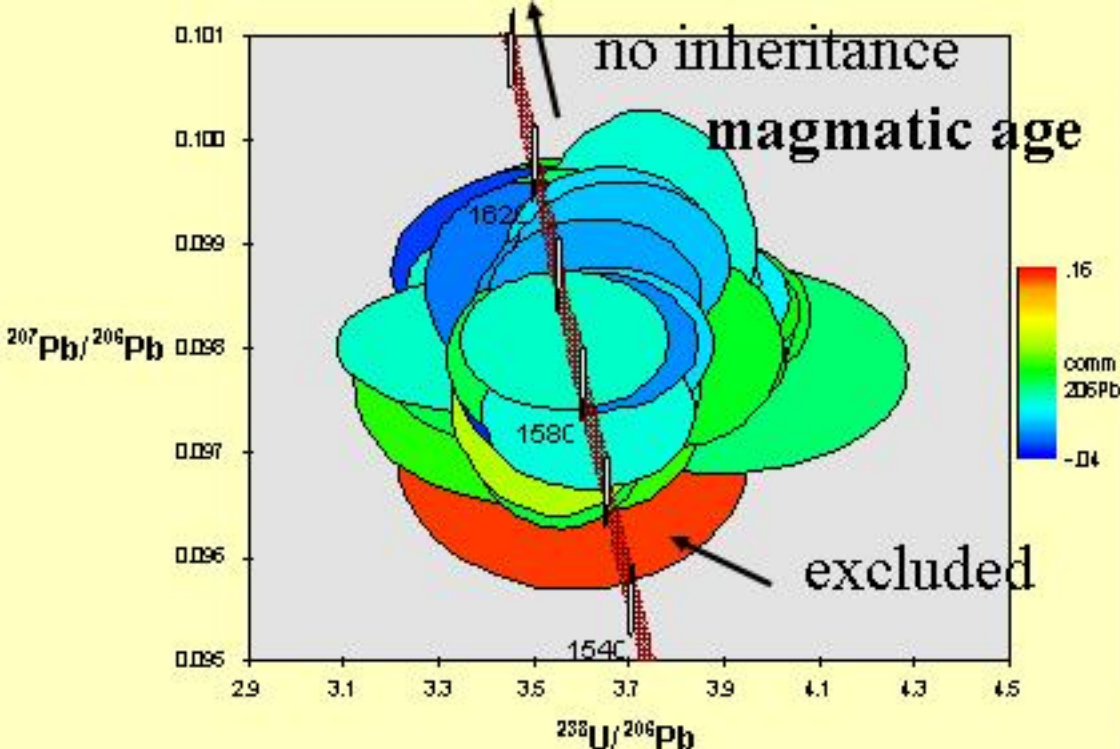
Warriner Ck 1 granite

Mean = 1708.4 ± 2.6 Ma

N=36 MSWD = 1.16







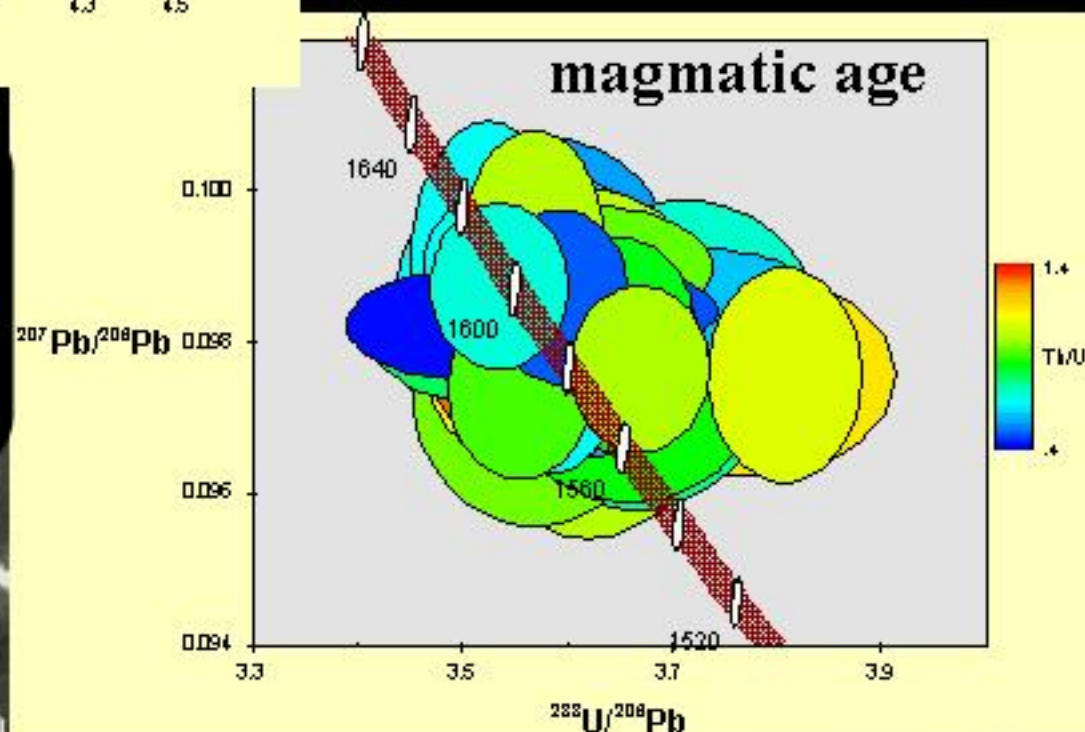
2003362542

Fine grained granite

Mean = 1589.6 ± 2.3 Ma

N=40 MSWD = 1.12

2003362541
intermediate gneiss
Mean = 1590.7 ± 3.3 Ma
N=35 MSWD = 1.3



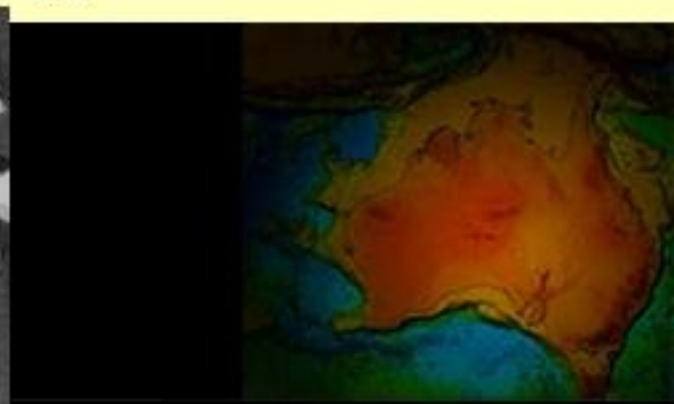
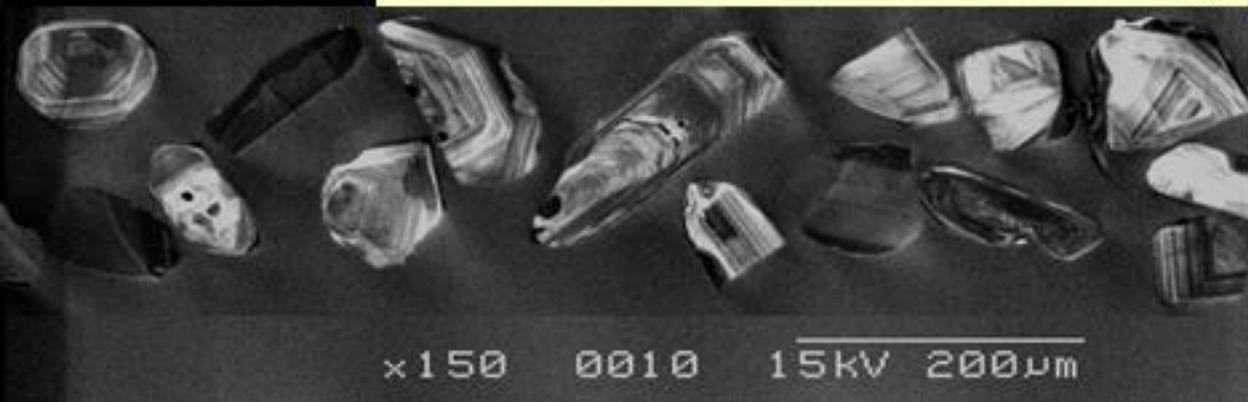
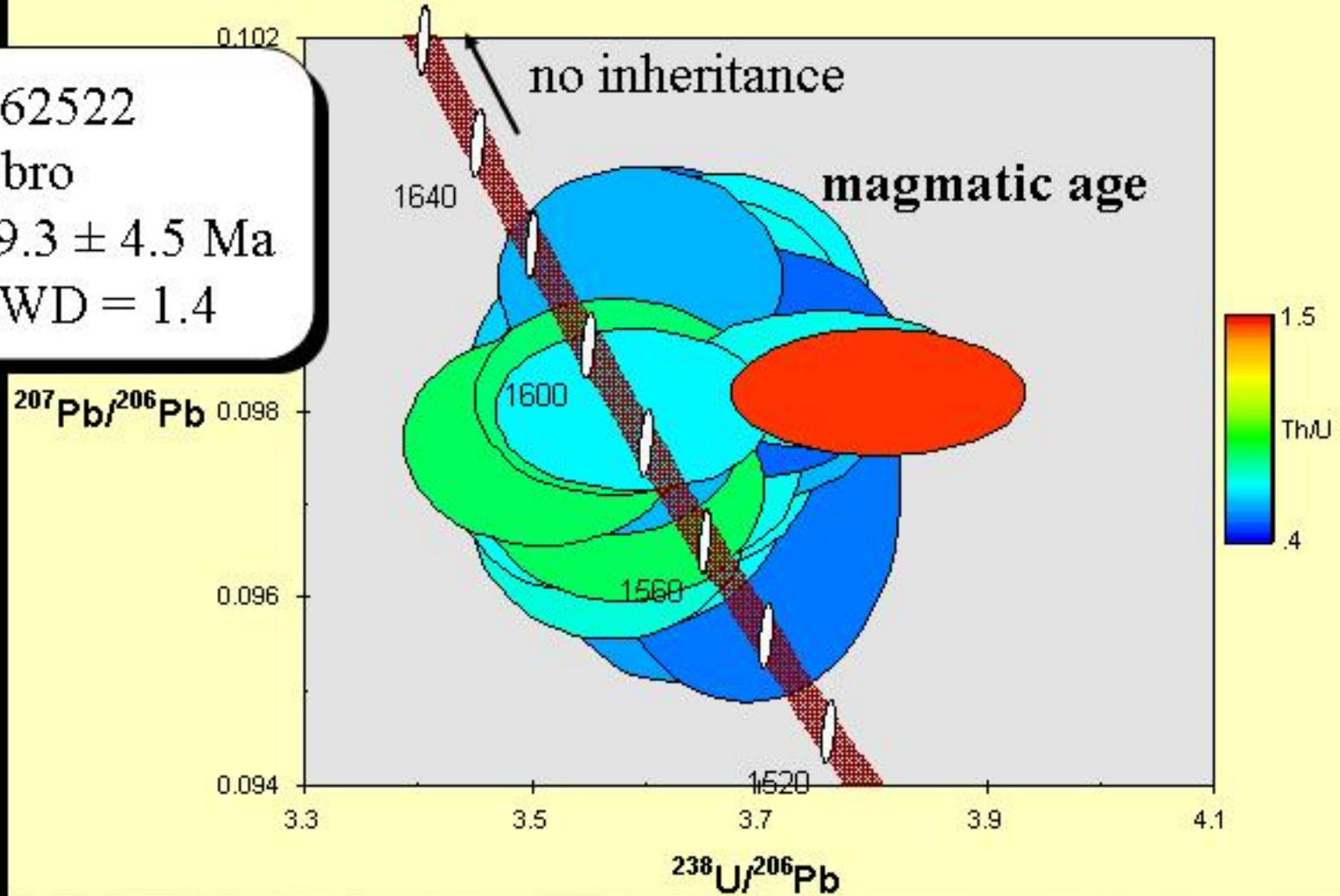
×150 0080 15kV 200μm

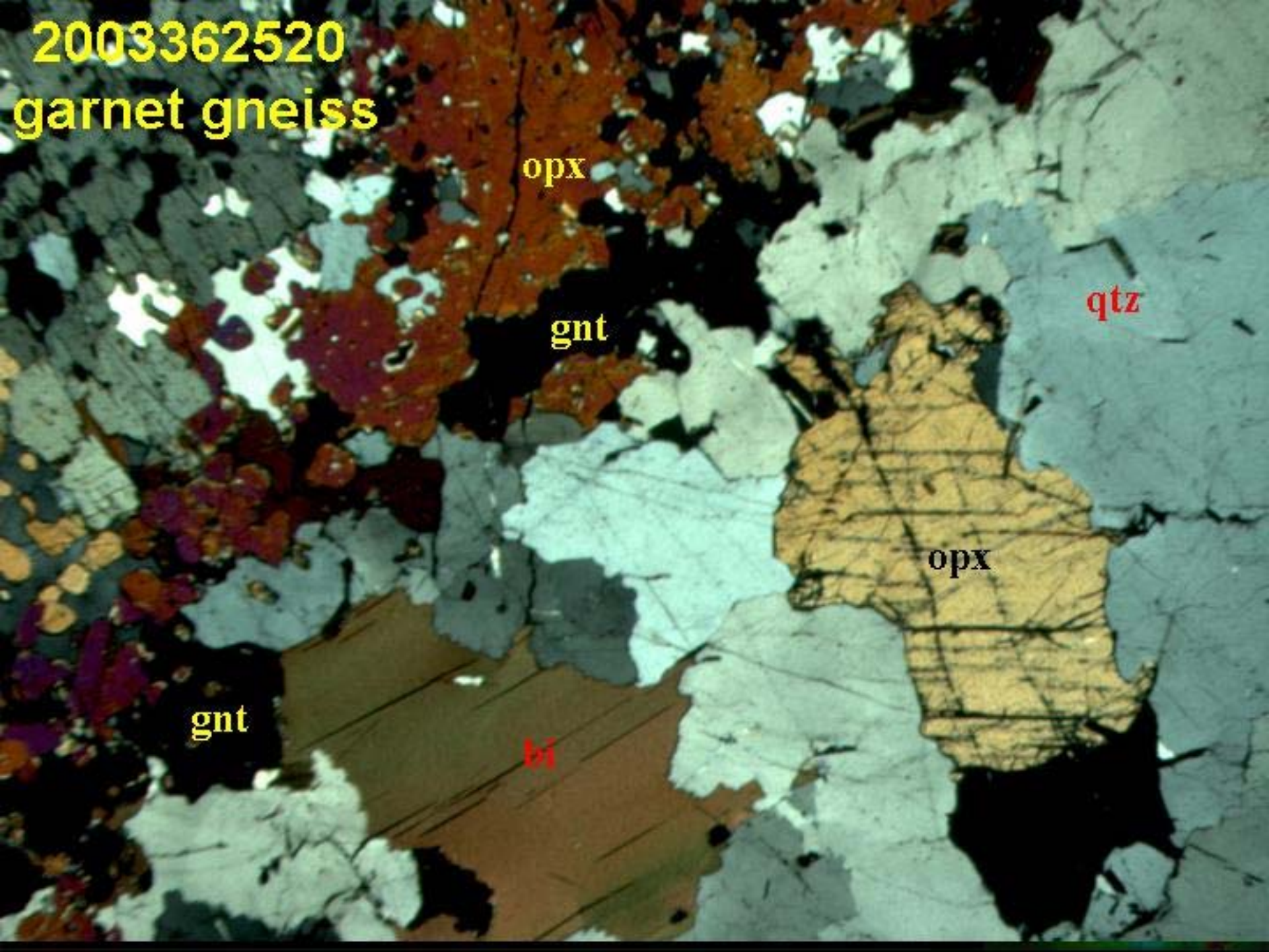
2003362522

gabbro

Mean = 1589.3 ± 4.5 Ma

N=25 MSWD = 1.4





2003362520

garnet gneiss

opx

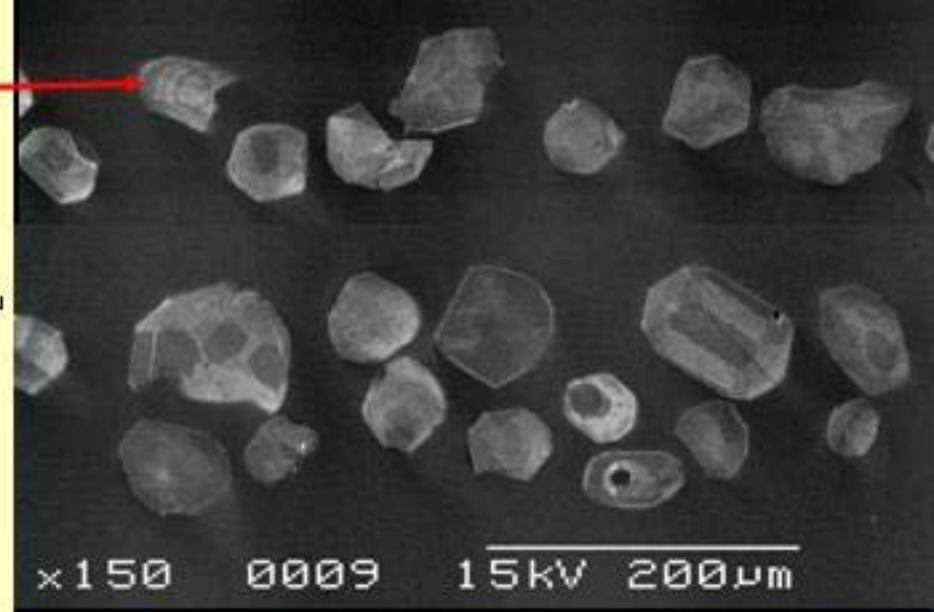
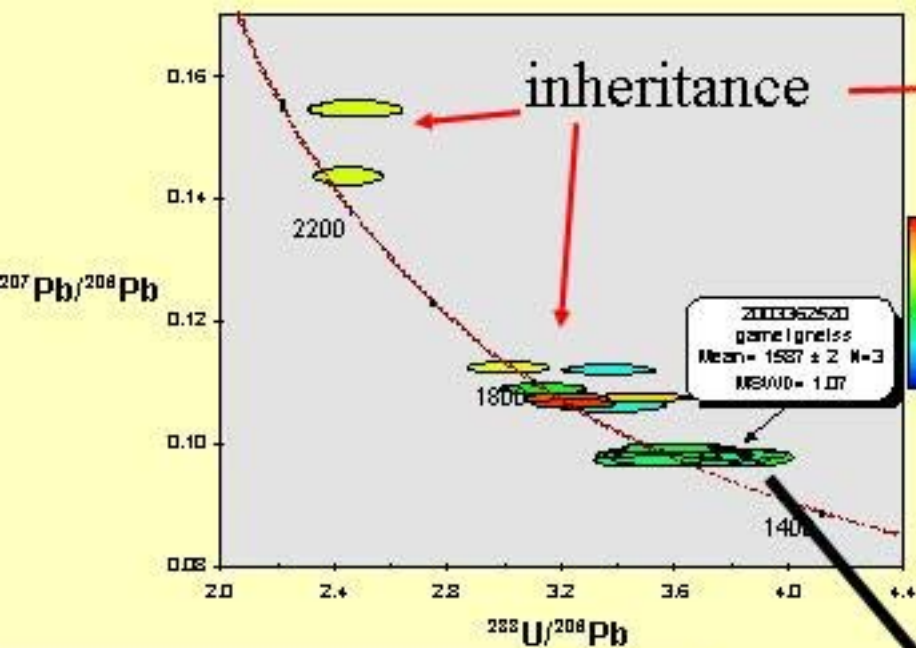
gnt

qtz

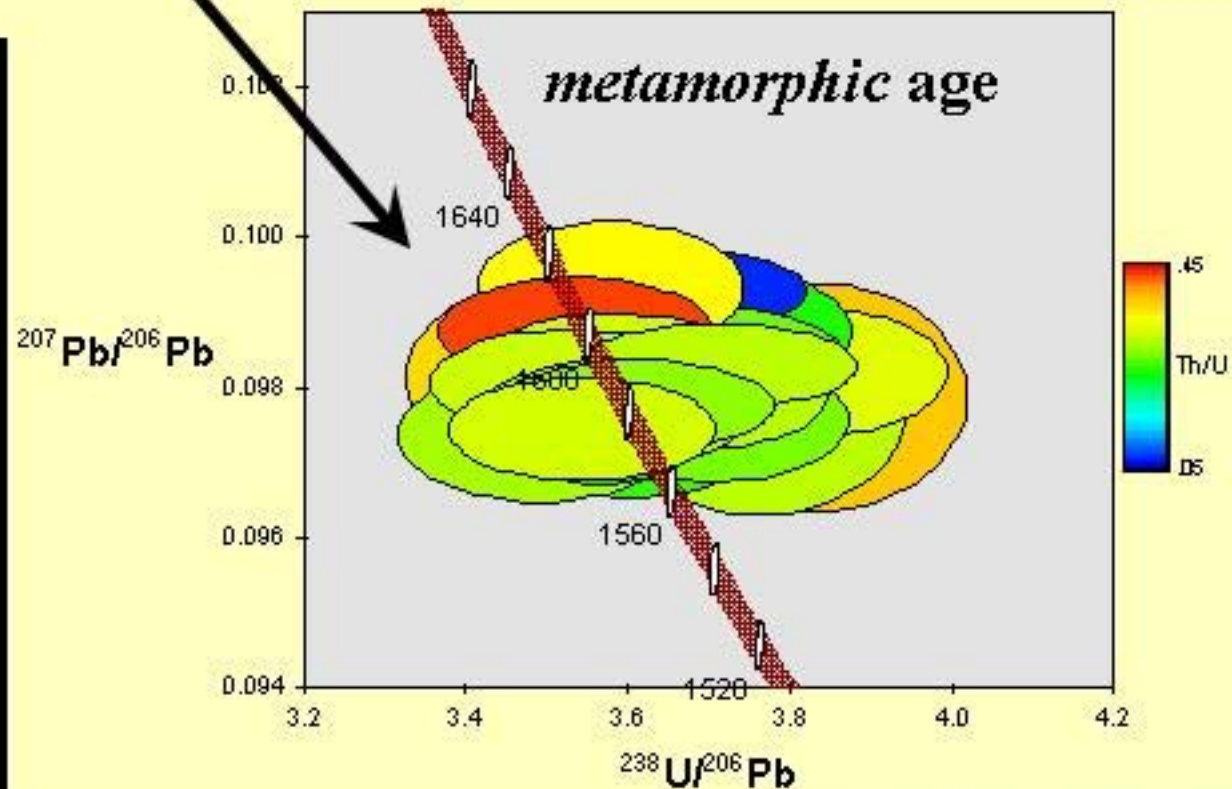
opx

gnt

bi



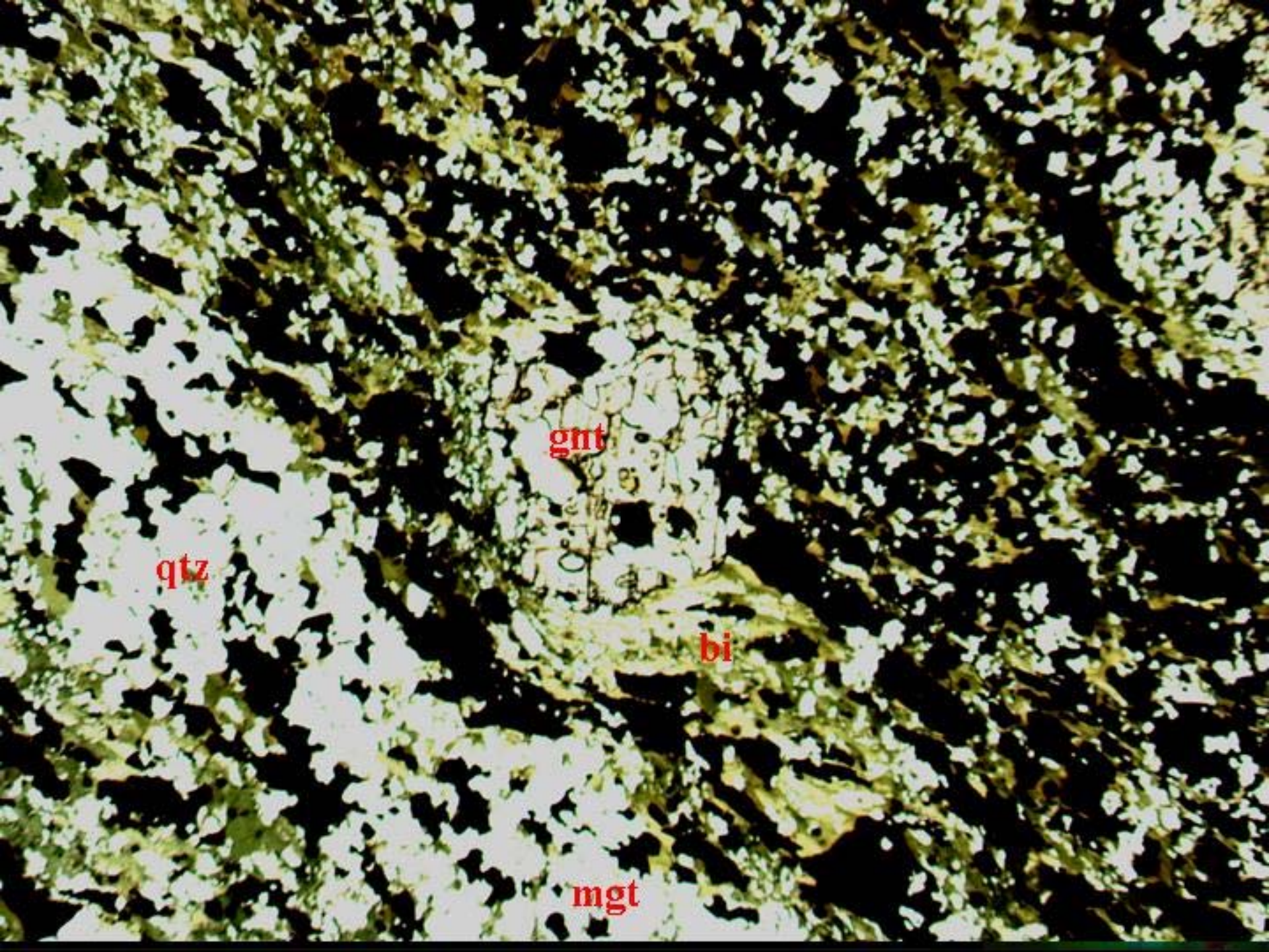
2003362520
garnet gneiss
Mean = 1587 ± 2 Ma
N=37 MSWD = 1.07



2003362524

garnet-biotite-magnetite schist



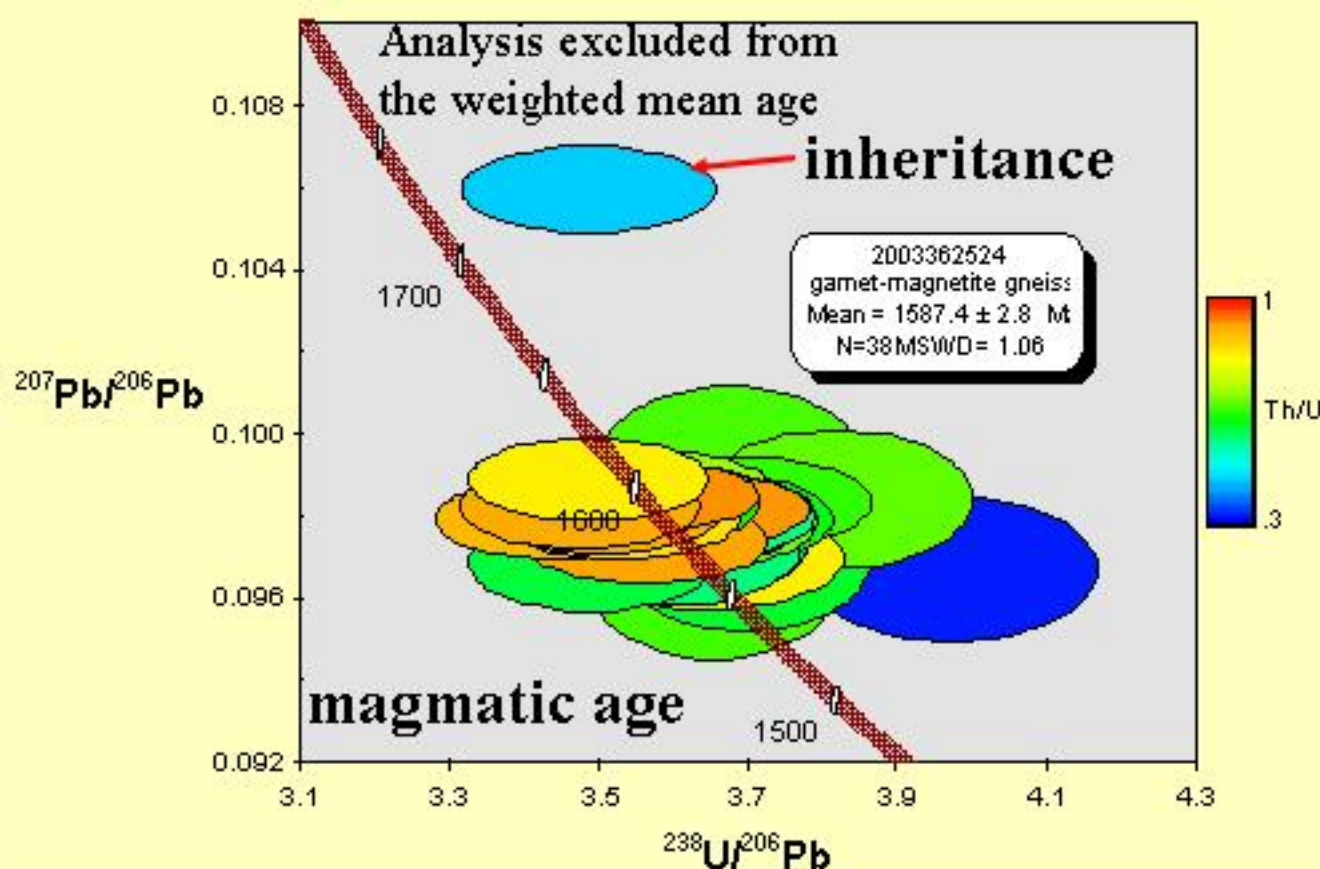


gnt

qtz

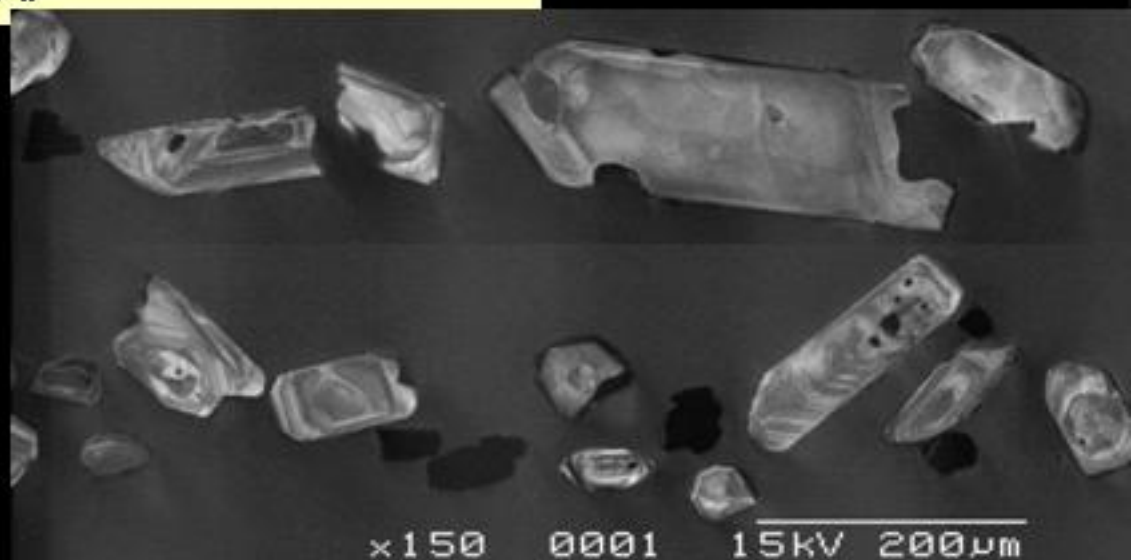
bi

mgt



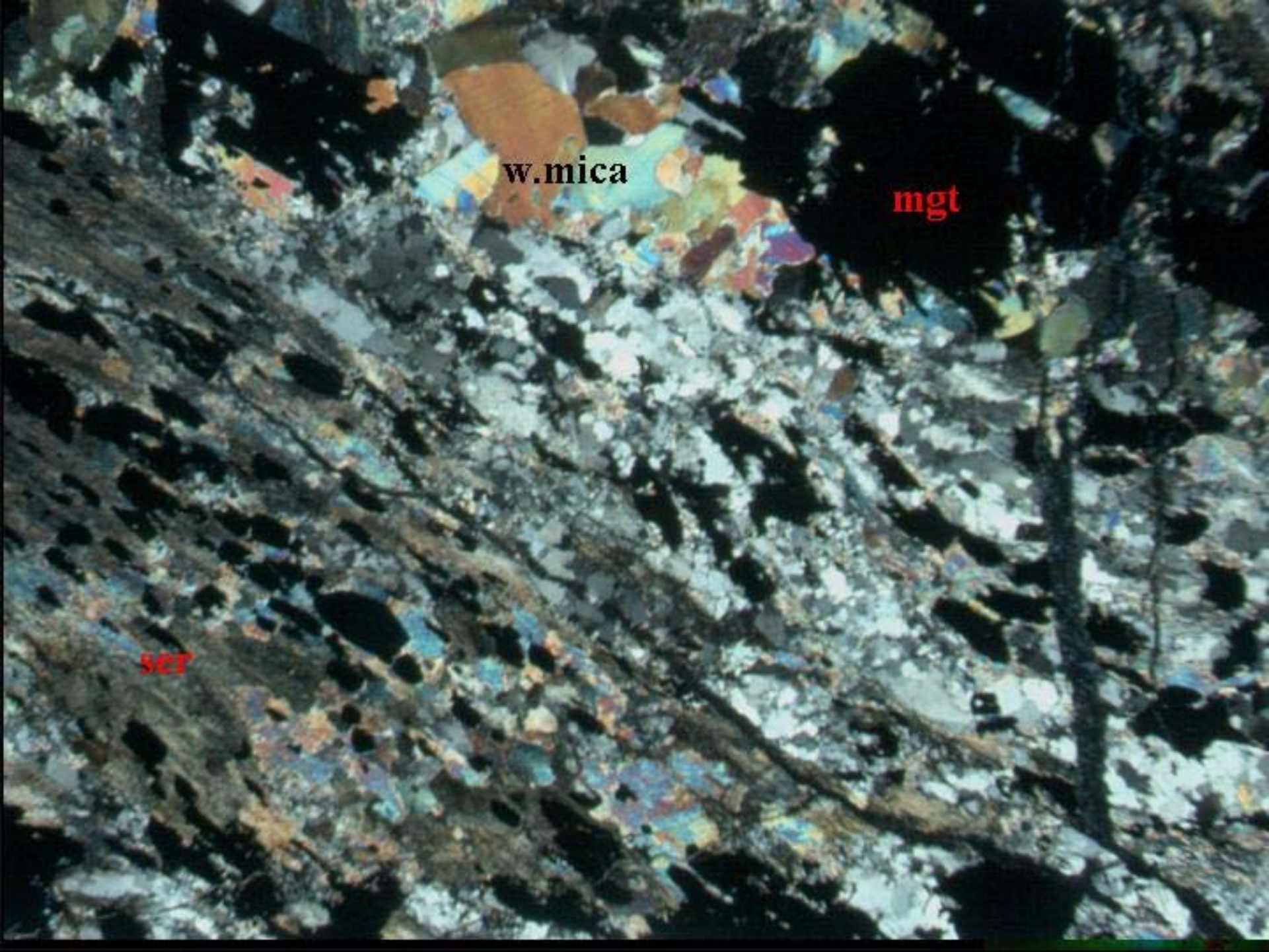
2003362524
garnet-biotite-mgt schist
Mean = 1587.4 ± 2.8 Ma
N=38 MSWD = 1.06

August 2004 - Gawler State of Play



2003362525A
foliated granite

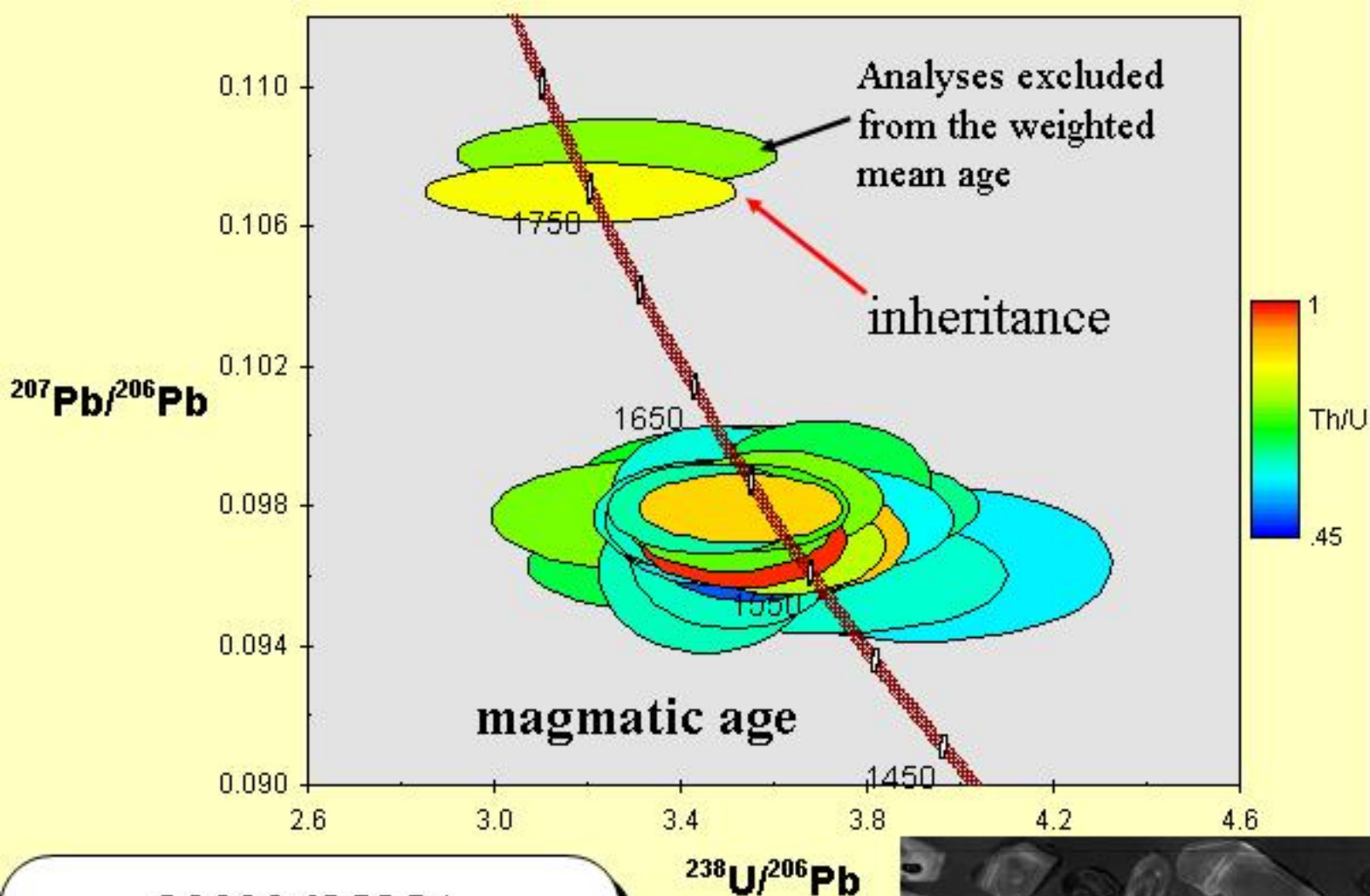




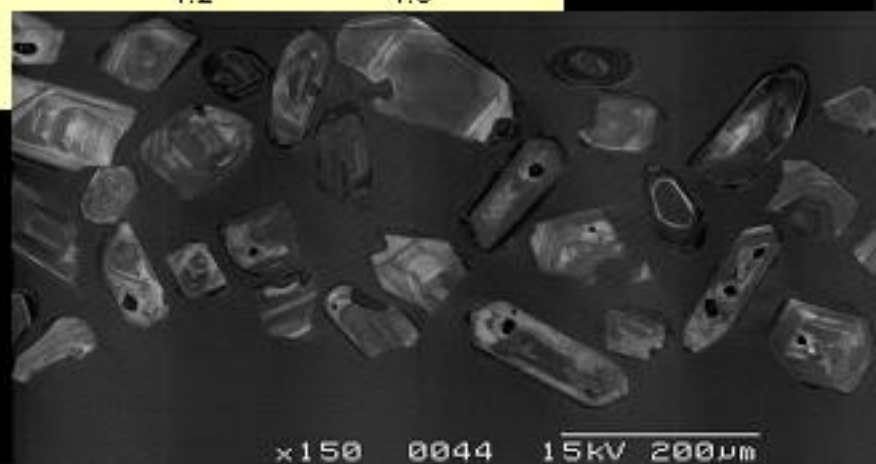
w.mica

mgt

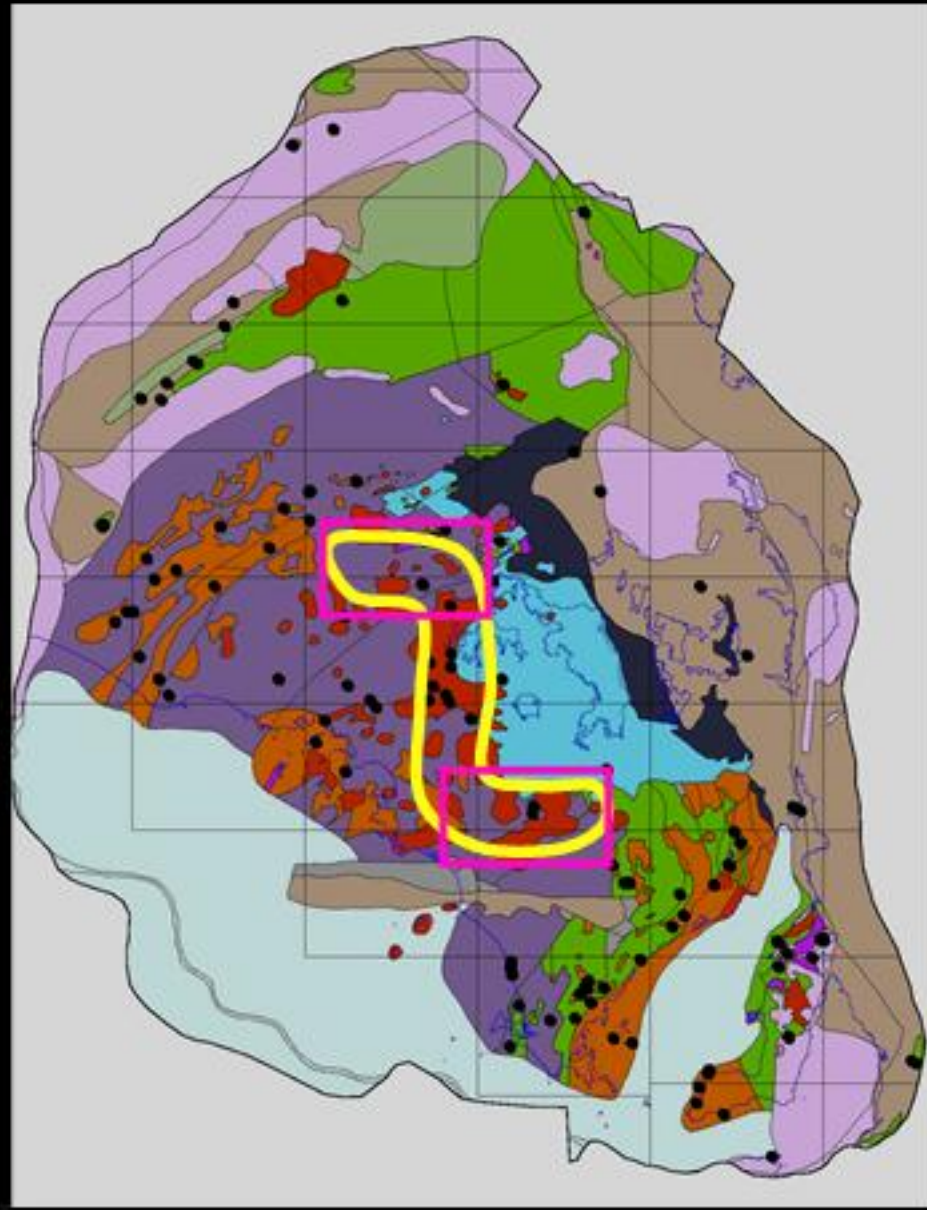
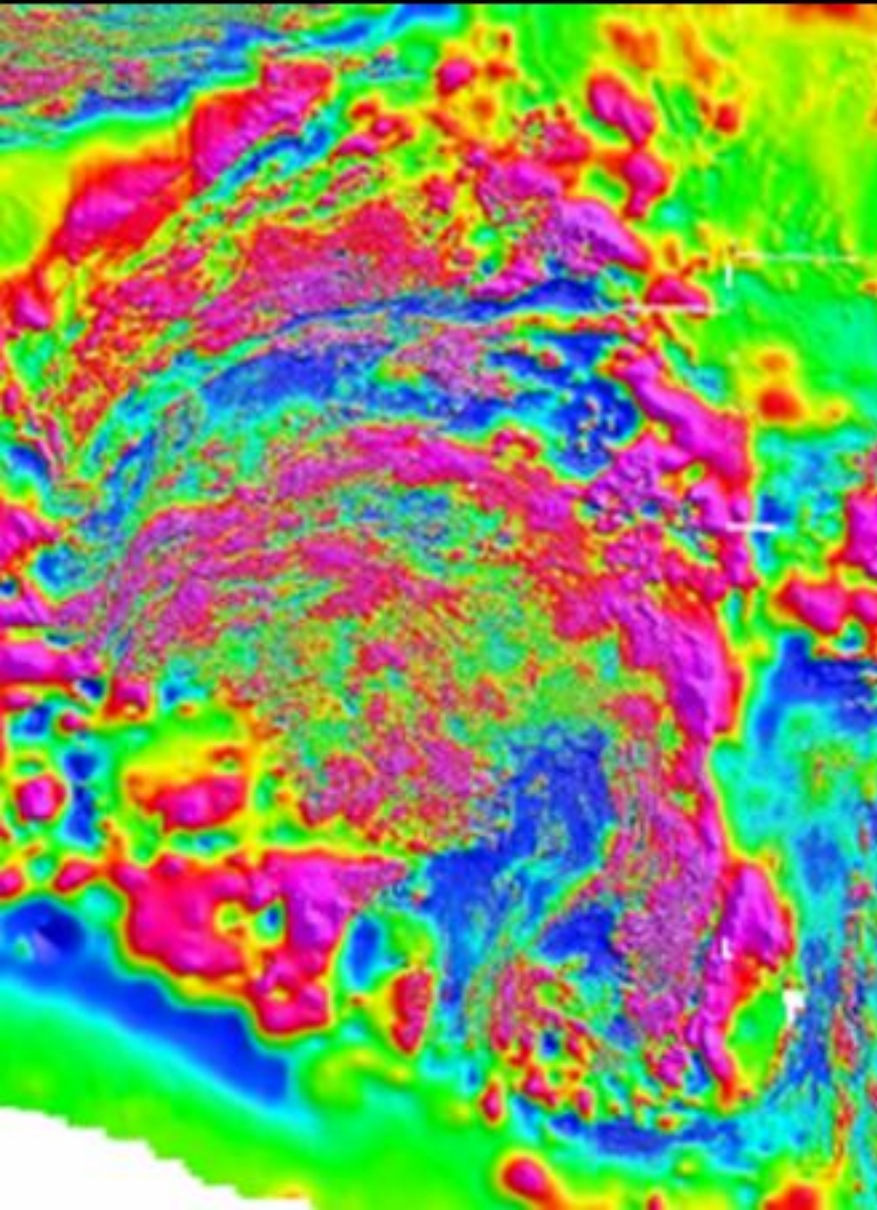
ser



2003362525A
Foliated granite
Mean = 1578.9 ± 4.2 Ma
N=31 MSWD = 1.04



CGGP

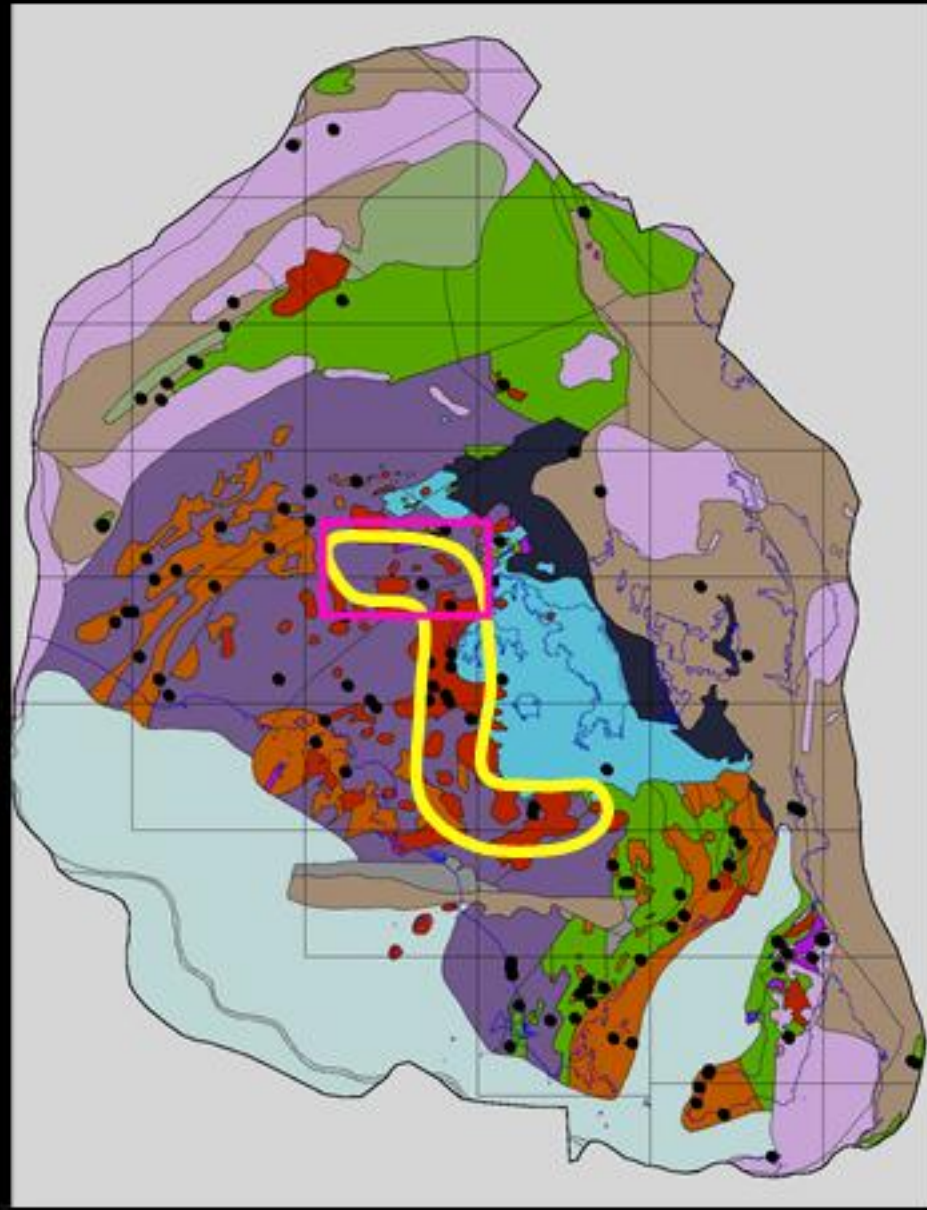
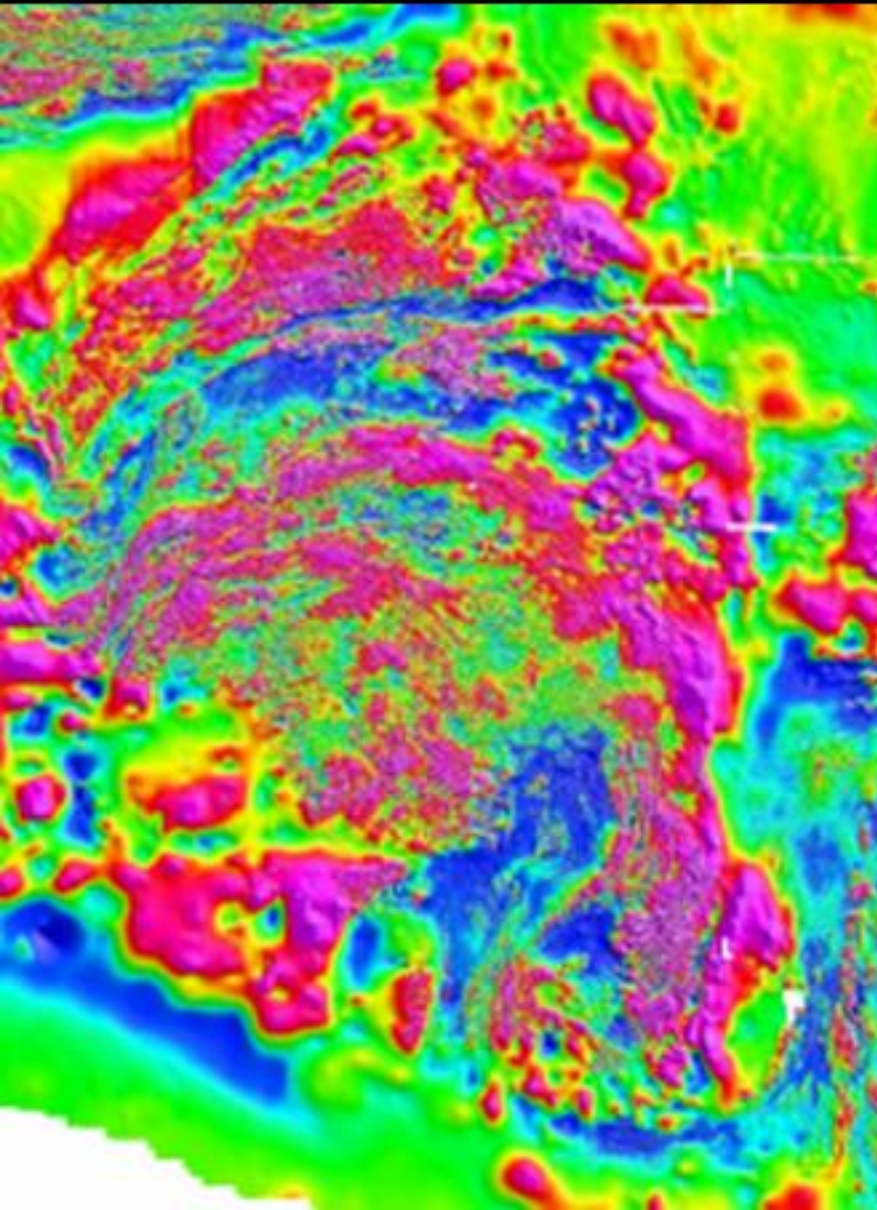


Research aims

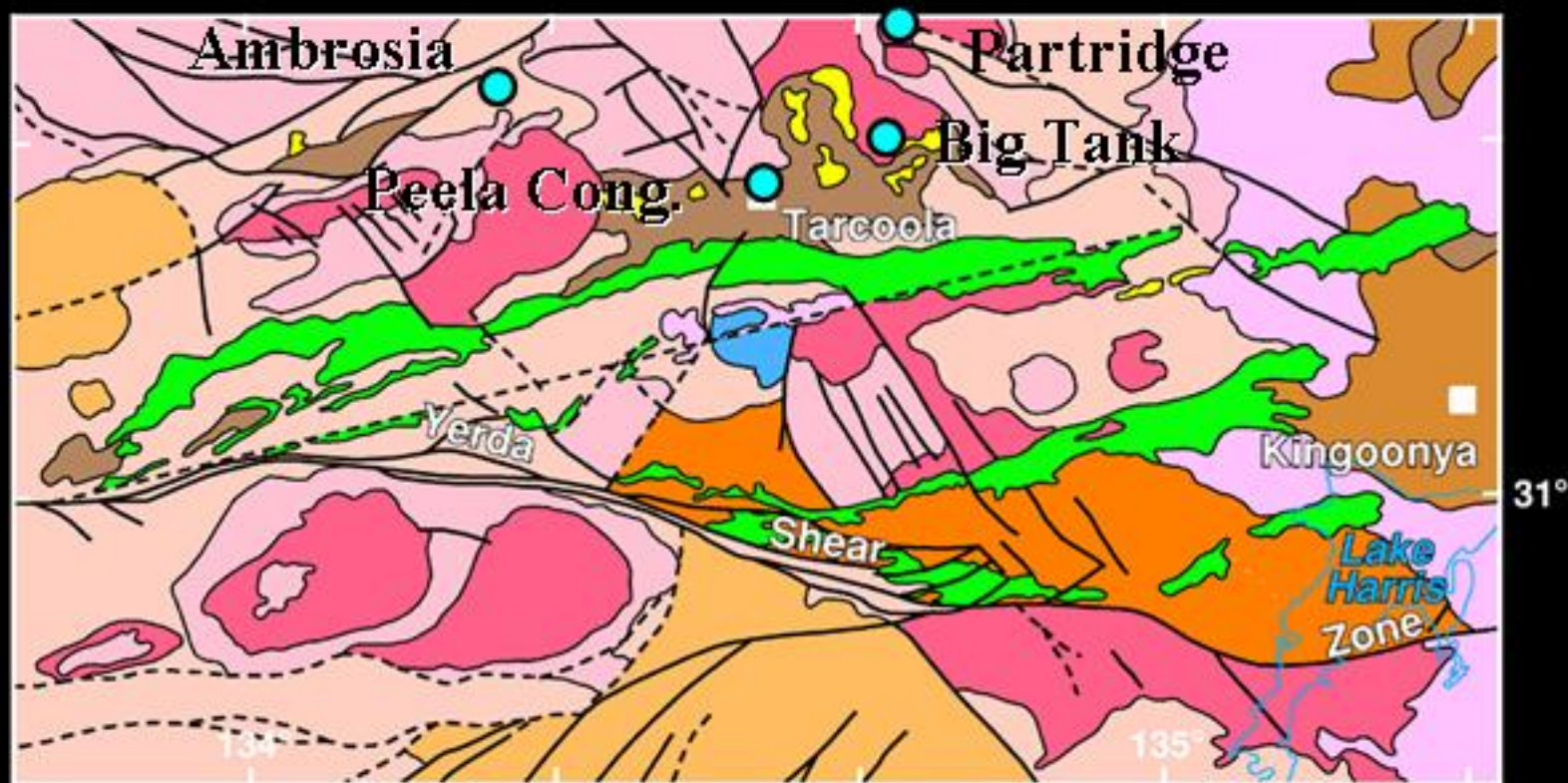
- Better define the extent of Hiltaba age (1580-1590 Ma) magmatism
- Are other ages significant in the region??
- Prove up geophysical interpretation of the basement geology
- Help constrain mineral systems
- Contribute to a multi-faceted approach to mineral exploration



Tarcoola goldfield



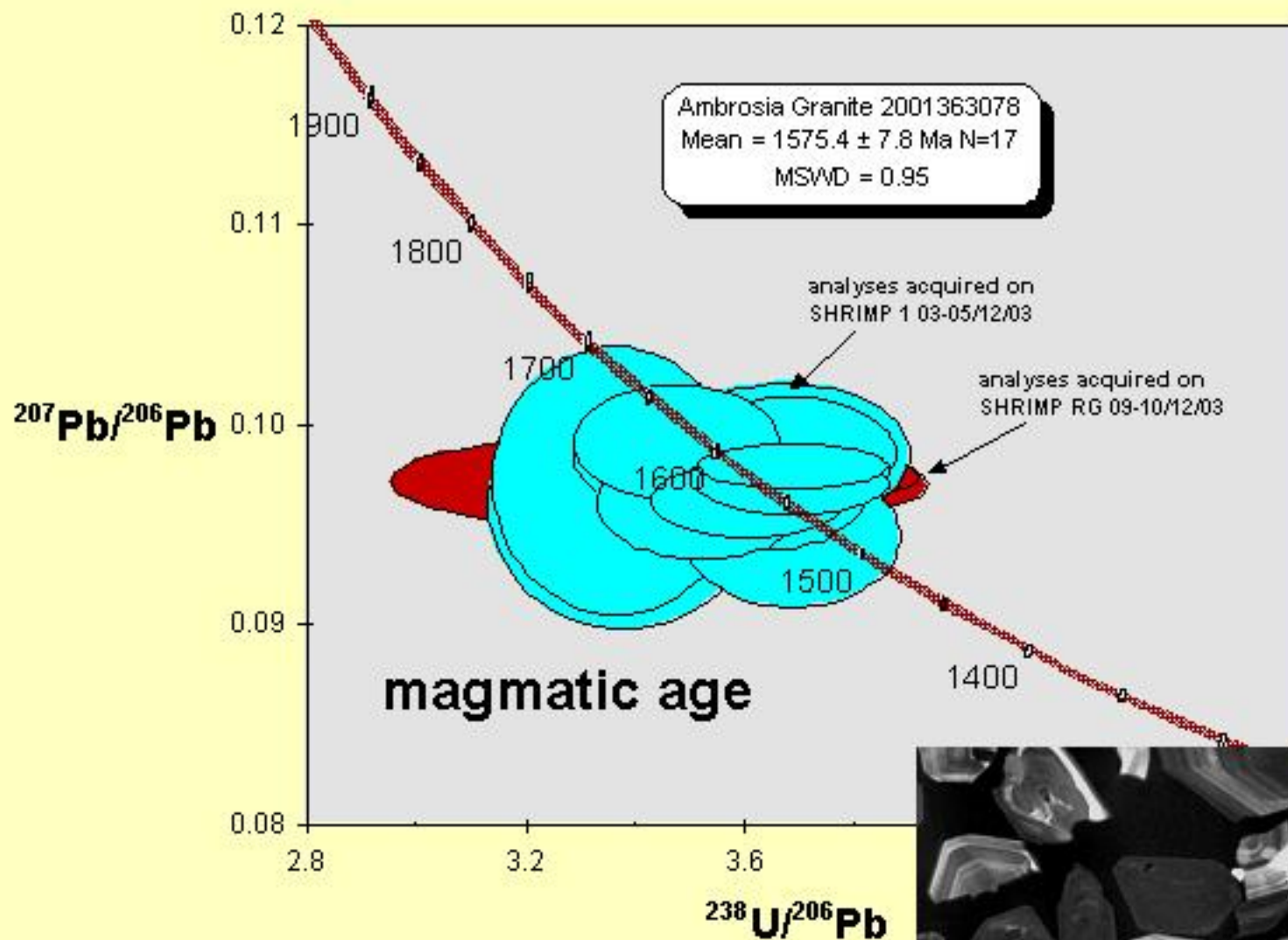
Geology based on geophysics



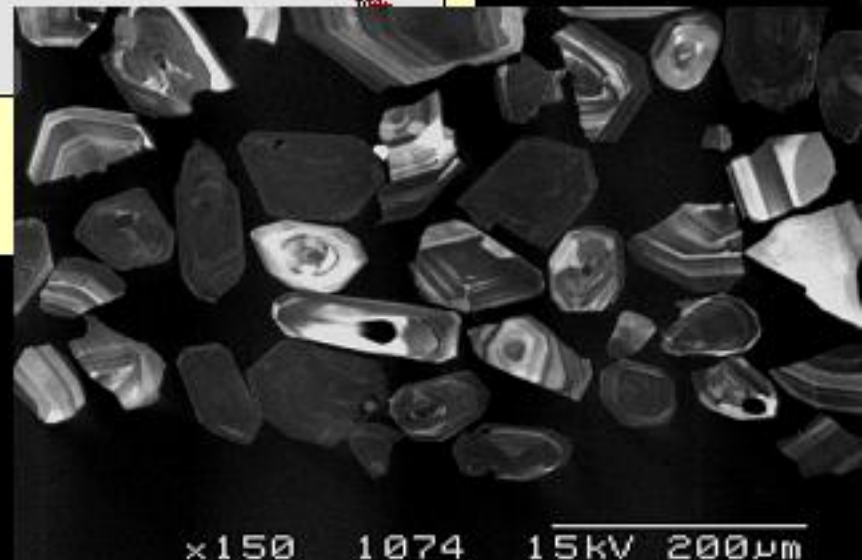
- Pandurra Fm (>~1425) seds
- Hiltaba Suite Granite (~1590): granite
- Gawler Range Volcs (~1590): volcs
- Muckanippie Anorth Suite (~?1630): anorth
- Tarcoola Fm (~1650): seds
- Symons Granite (~1690), St Peter Suite (~1630): granite
- Wilgena Hill Jaspilite (>~1740): banded iron fm
- Glenloth Gran (~2500): gneissic gran
- Harris Greenstone Seq. (>~2500): komatiite, basalt, felsic volcanics, banded iron formation, metasediments
- Undiff Precamb basement: gran, orthogneiss, paragneiss

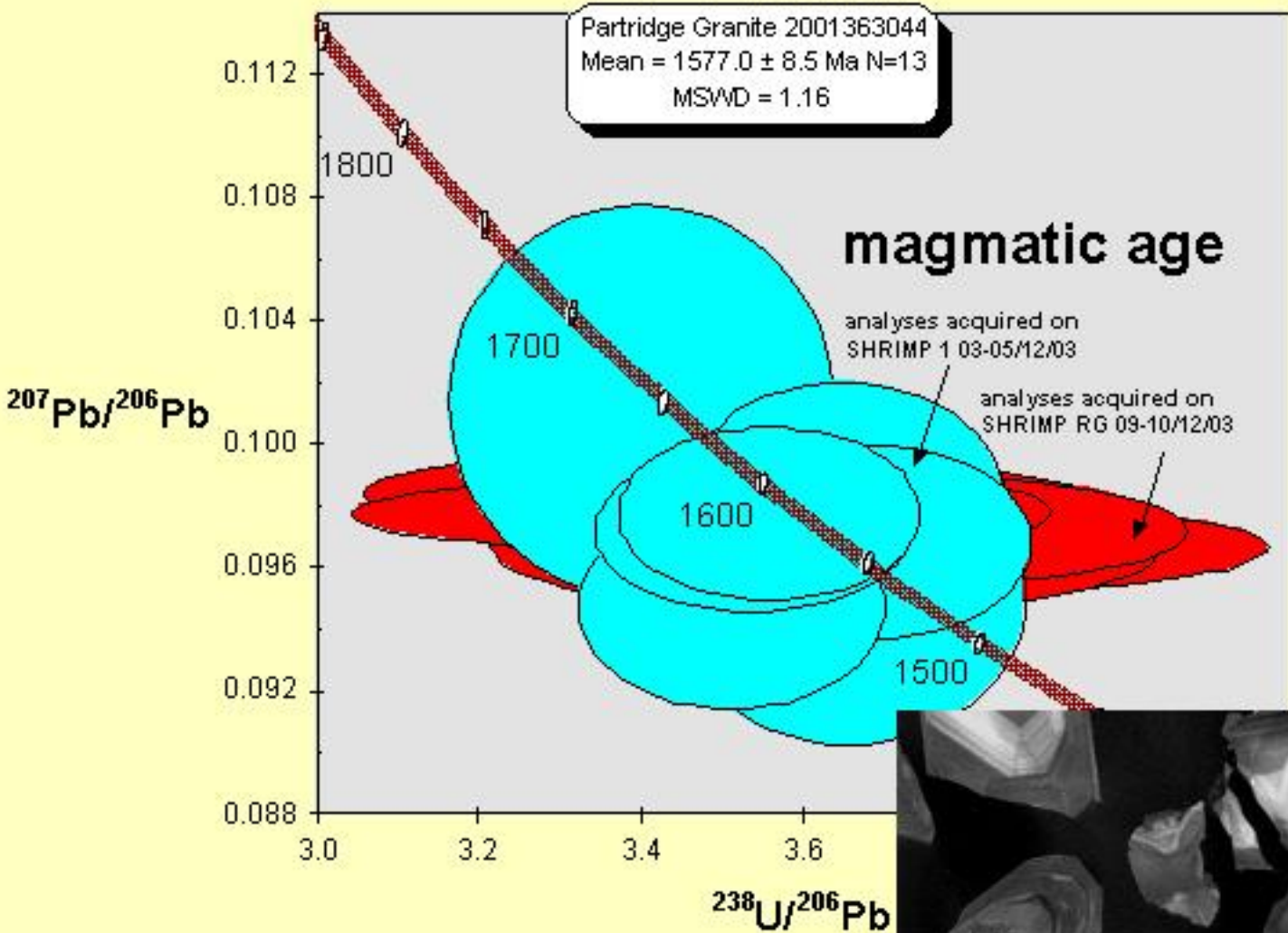
(Ages shown in Ma)

30 km

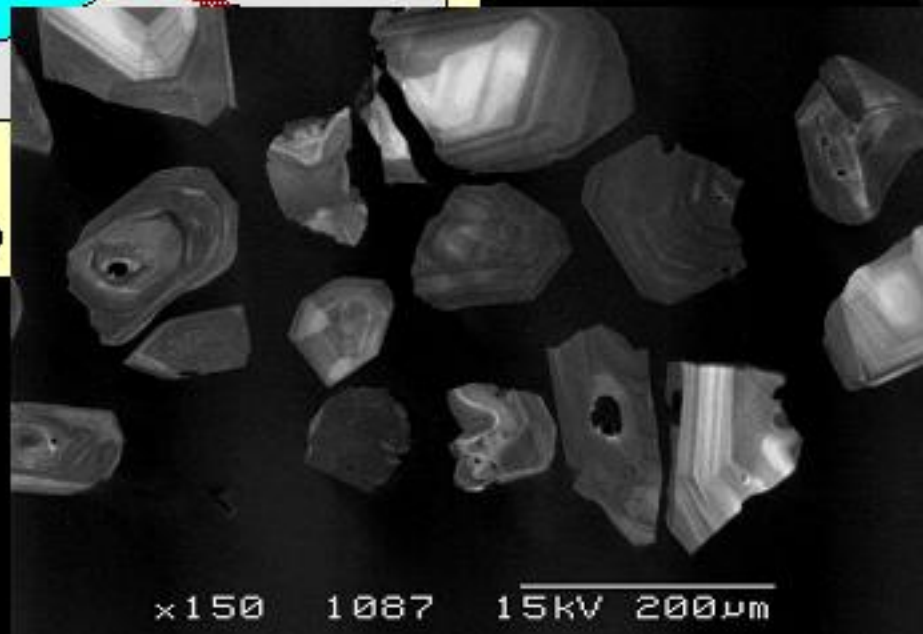


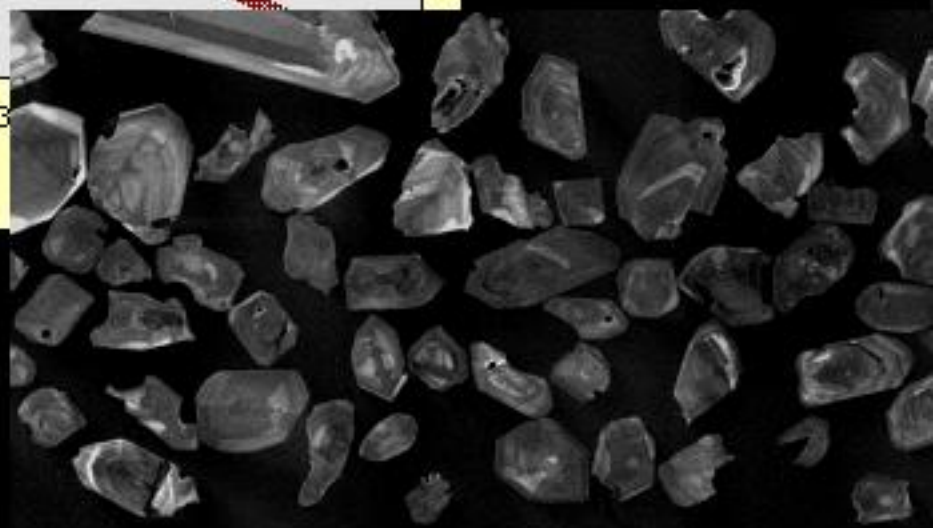
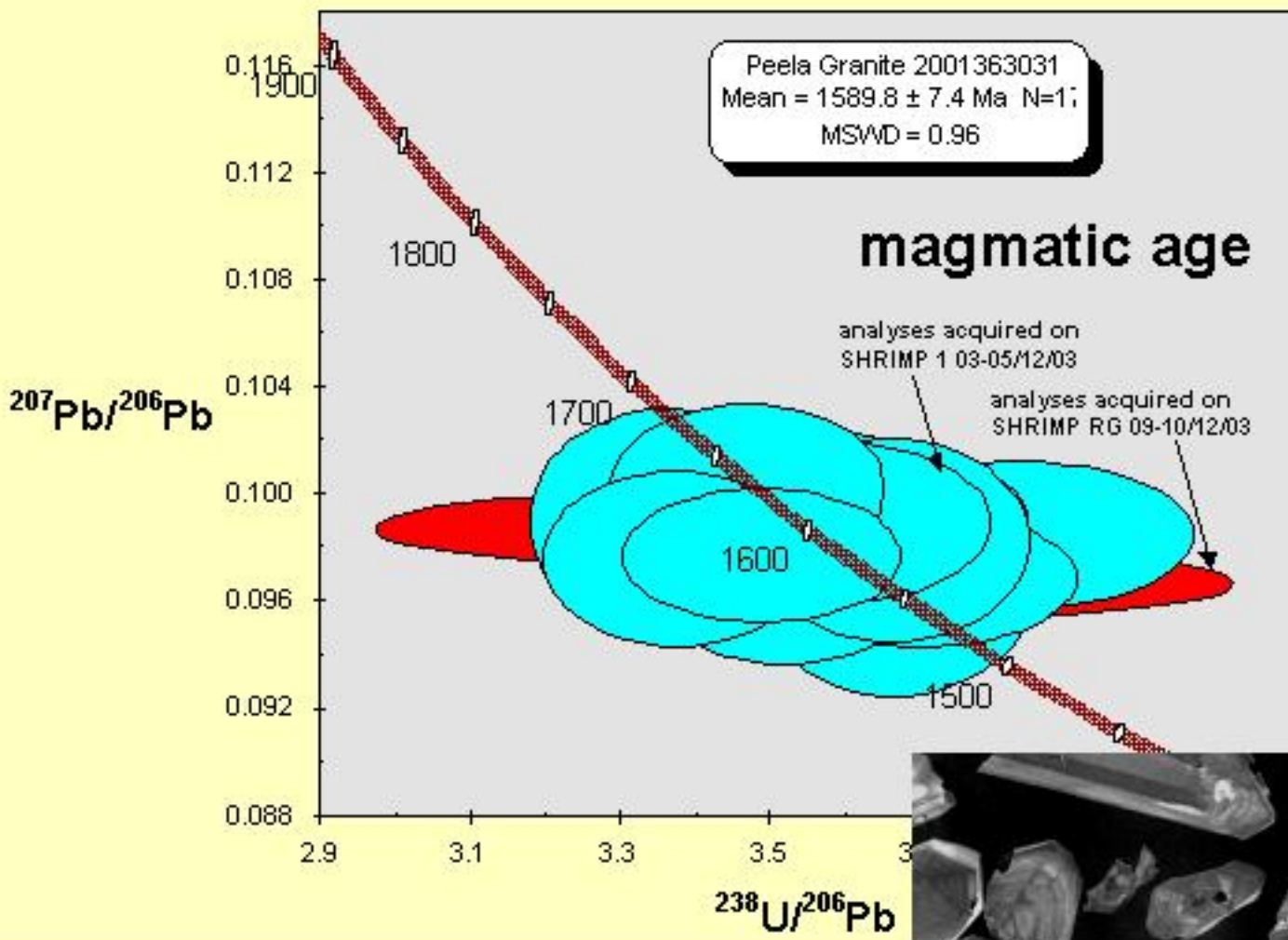
**Ambrosia Granite
(2001363078)
 1575.4 ± 7.8 Ma**





**Partridge Granite
(2001353044)
 1577.0 ± 8.5 Ma**

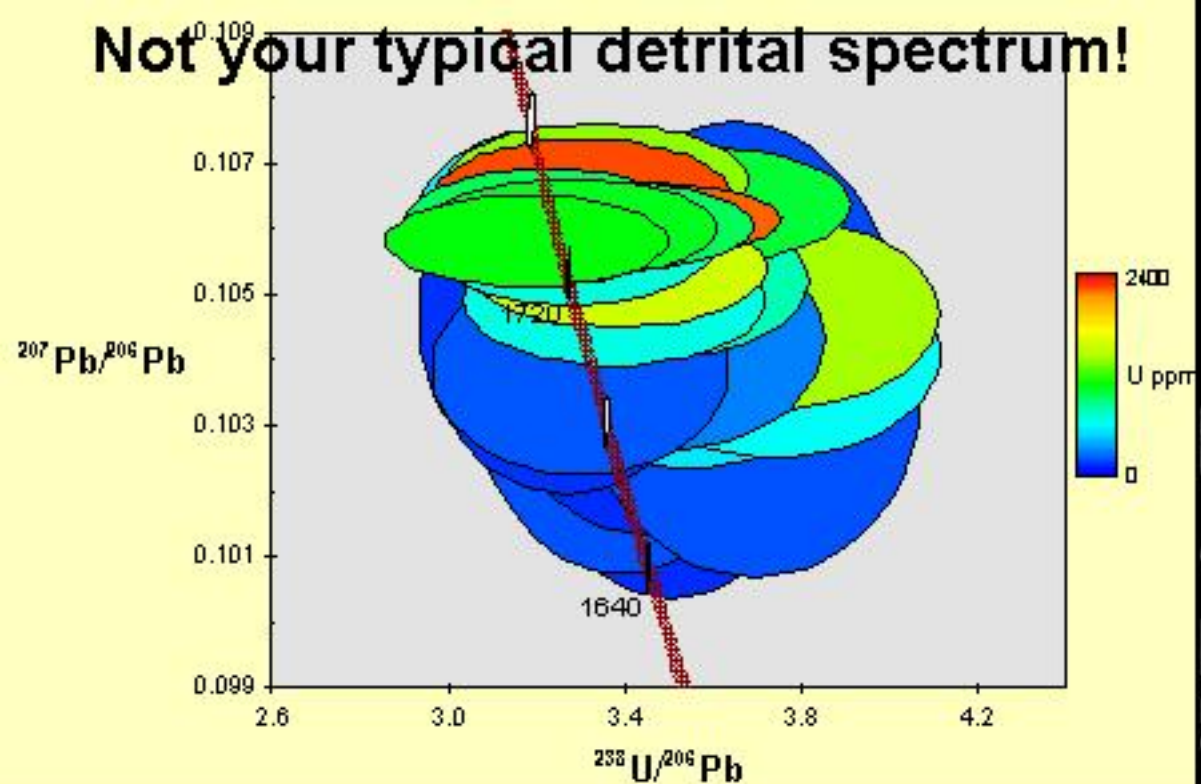




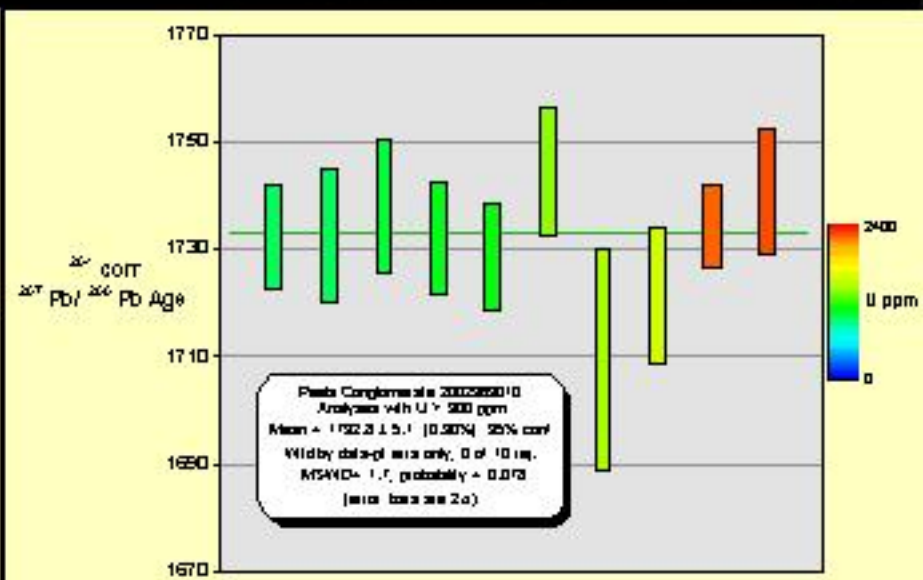
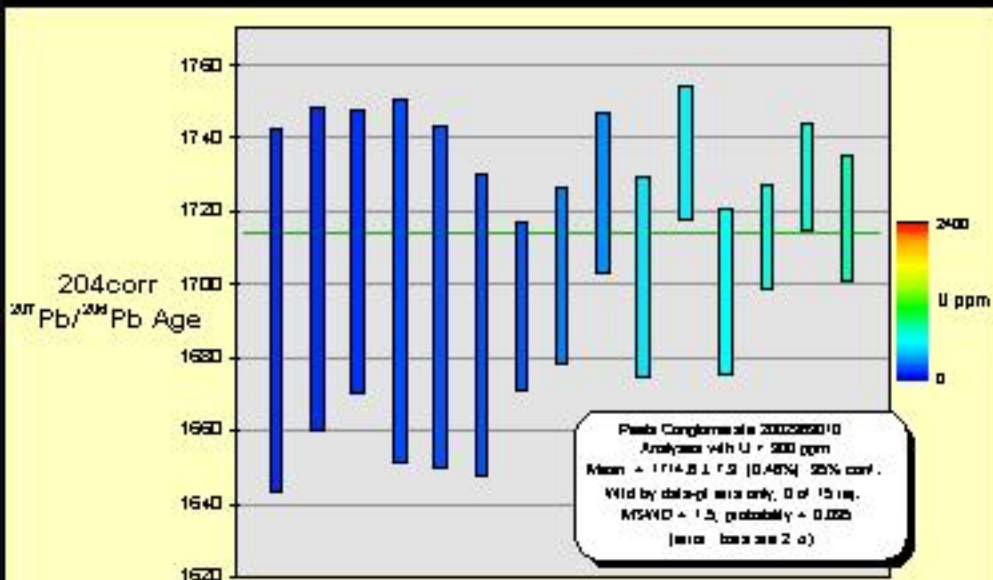
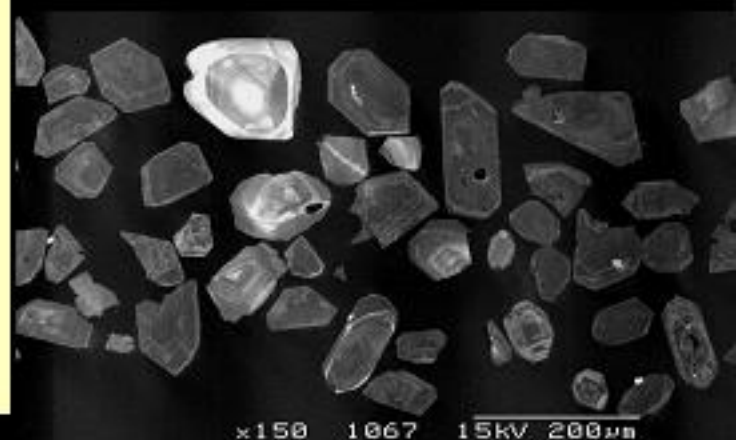
×150 1092 15kV 200μm

**Big Tank Granite
(2001363031)
 1589.8 ± 7.4 Ma**

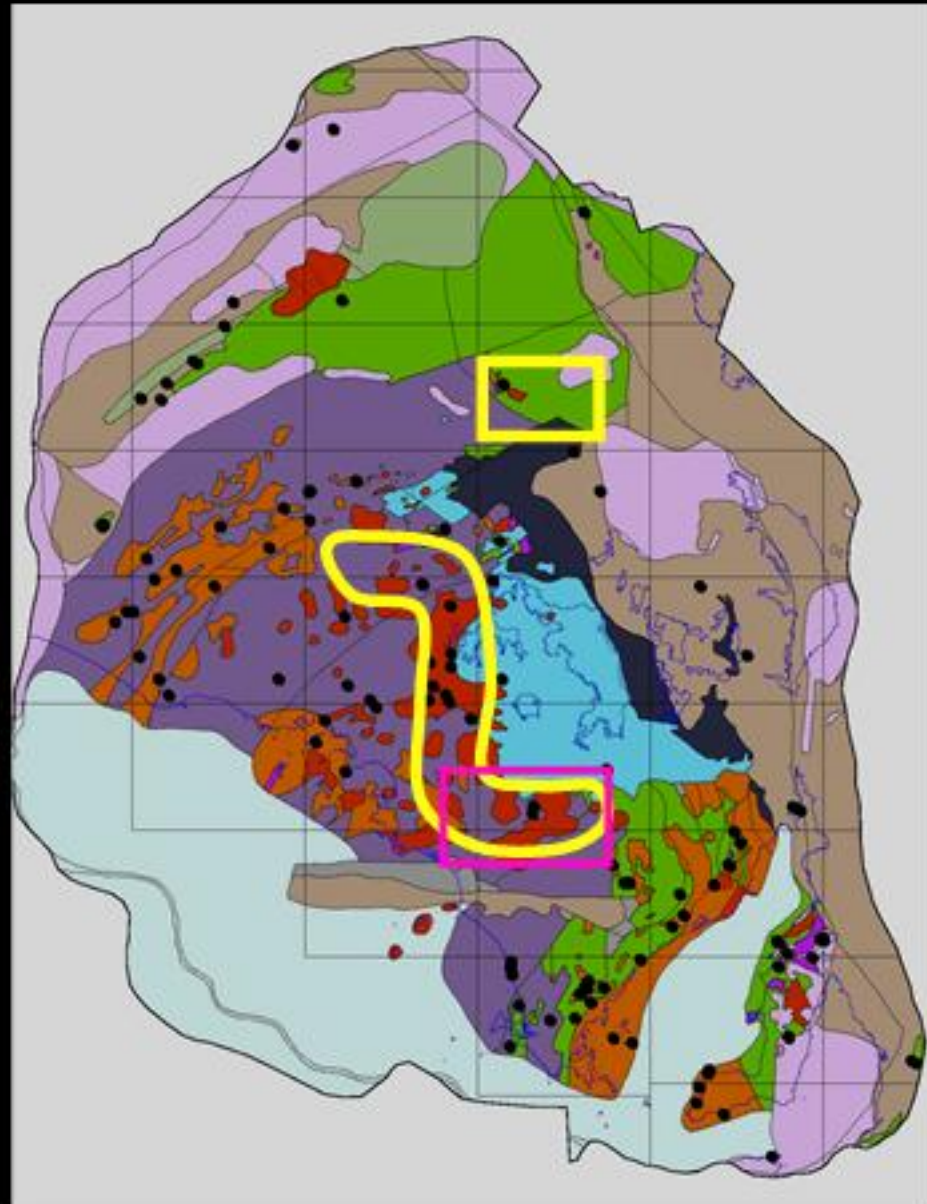
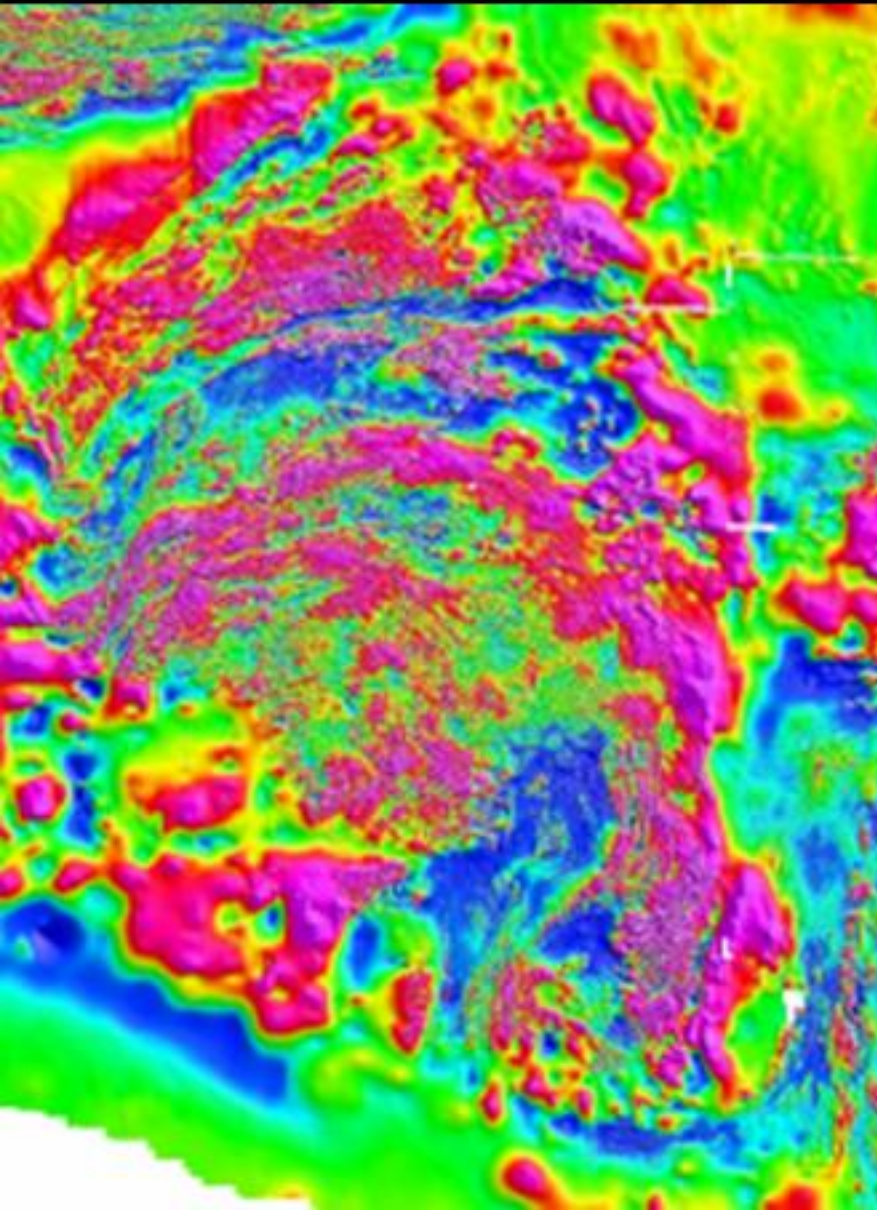
Not your typical detrital spectrum!



**Peela
Conglomerate**
 1714.6 ± 7.9 Ma
 1732.8 ± 5.1 Ma



Weednanna & Barns



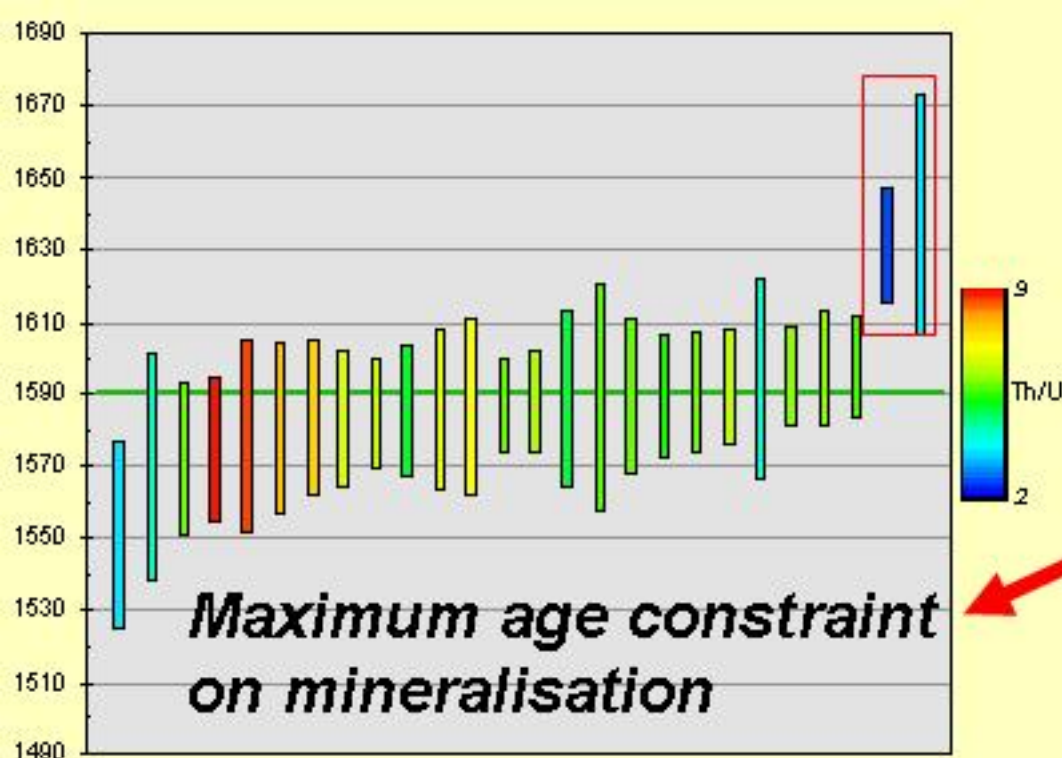
Weednanna granite

Myr. plag

qtz

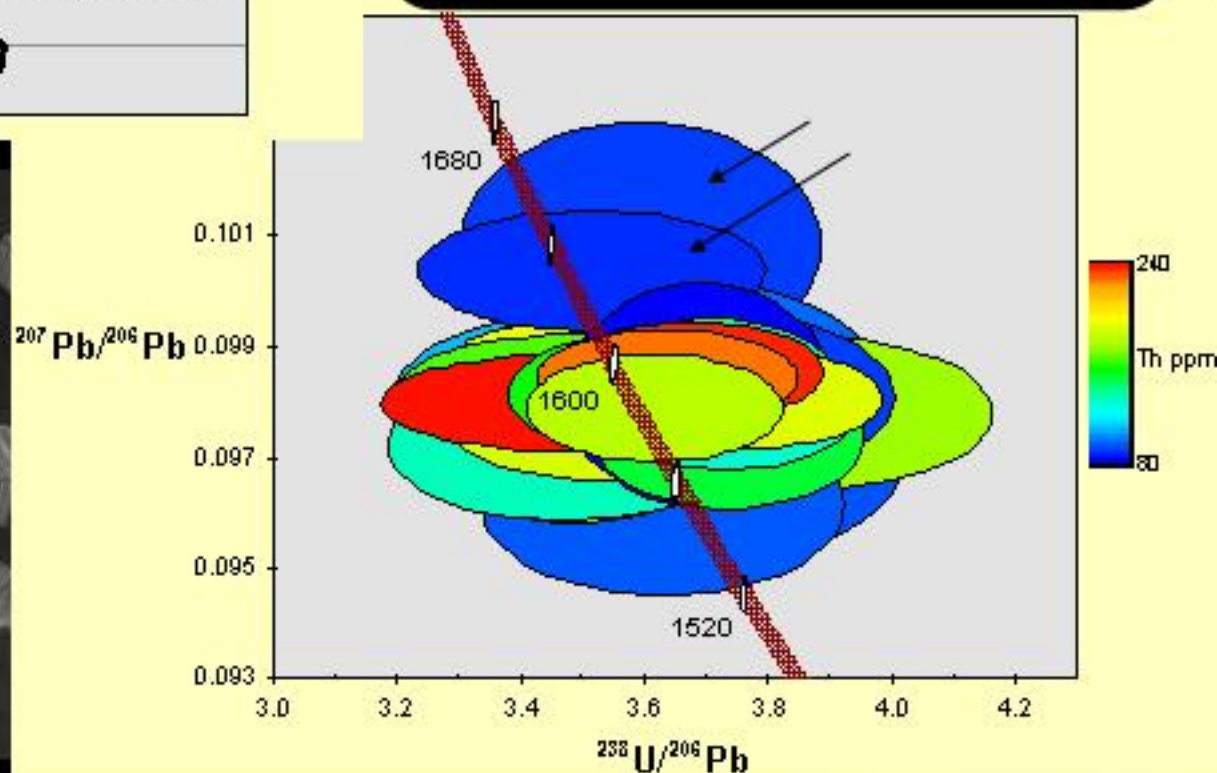
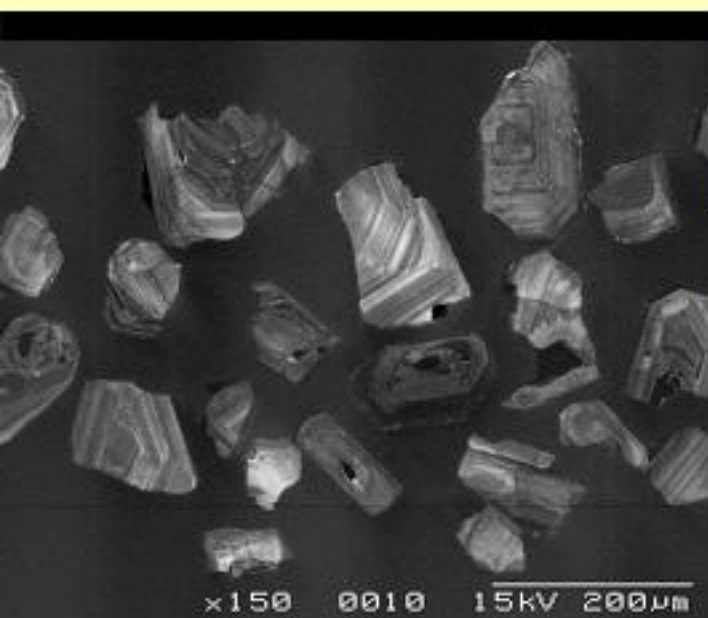
ser

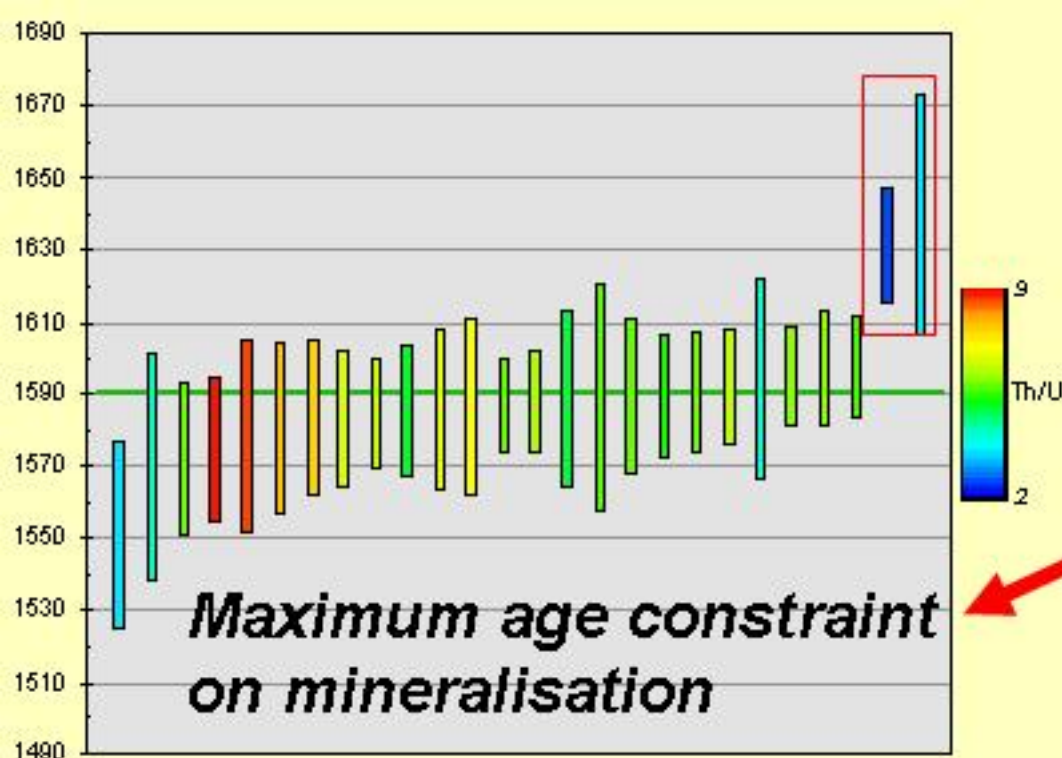




Weednanna granite
 Mean = 1590.1 ± 5.7 Ma
 N=26 MSWD = 2.3

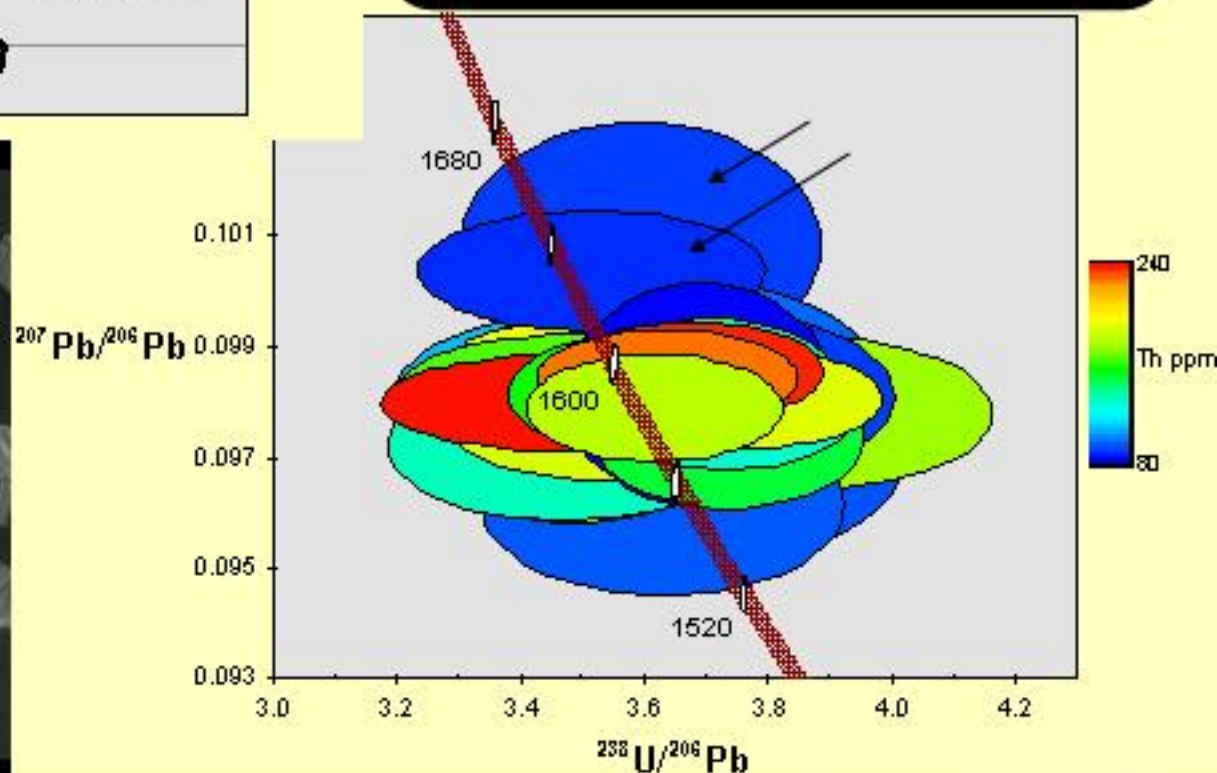
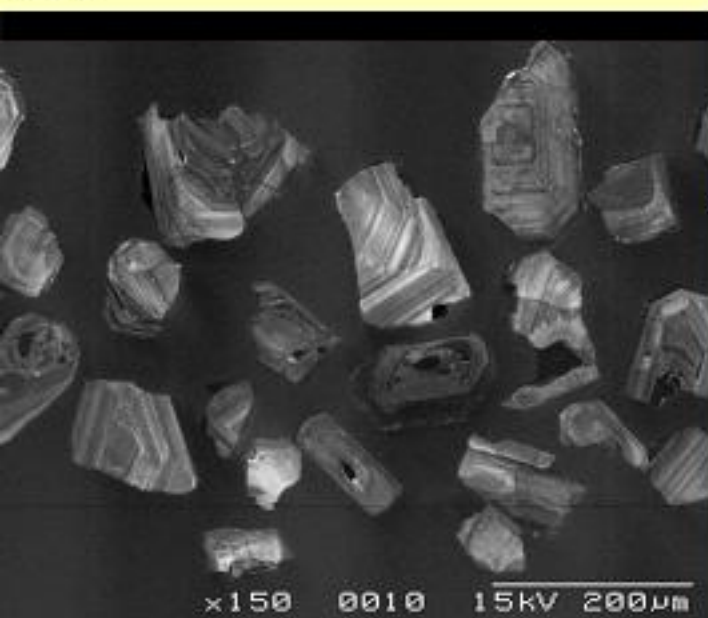
Mean = 1587.1 ± 3.7 Ma
 N=24 MSWD = 0.86
 probability = 0.66



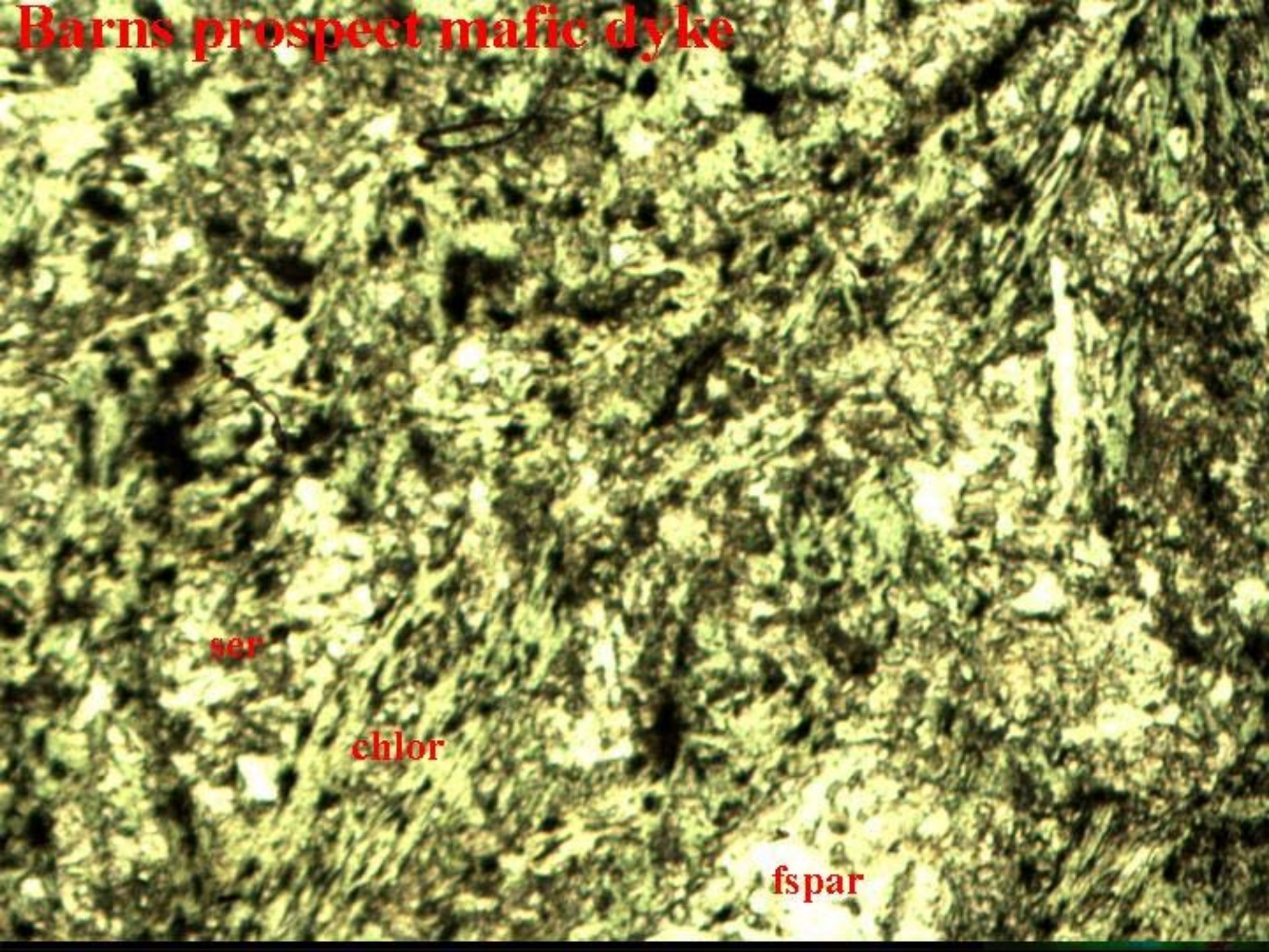


Weednanna granite
 Mean = 1590.1 ± 5.7 Ma
 N=26 MSWD = 2.3

Mean = 1587.1 ± 3.7 Ma
 N=24 MSWD = 0.86
 probability = 0.66



Barns prospect mafic dyke



ser

chlor

fspar

Conclusions

Mt Woods Inlier:

- **Felsic *and* mafic magmatism defined @ ~1590 Ma**
- **Younger event @ ~1580 Ma - timing of deformational fabric and major shearing??**
- **Sediments still unknown**
- **Search for more (1710-1730 Ma) Kimban ages and evidence of Grenvillian**



Conclusions (cont.)

Central Gawler Gold Province:

- Tarcoola region - Hiltaba Age is dominant (magmatism @ ~1580 & ~1590 Ma) but 1715-1730 Ma important
- Revision of basement geology map continues, testing geophysics
- Maximum age constraint on mineralisation
- Coupling U-Pb dating with other work, is helping us understand mineral systems

Acknowledgements

- **RSES SHRIMP community**
- **Geoscience Australia Gawler Craton Project**
- **GA Geochronology Group**
- **GA's Min Sep Lab**
- **PIRSA - Gawler Craton Program and Core Library**
- **Adelaide Resources**
- **Aquila Resources**

