



Government of Western Australia
Department of Mines and Petroleum



Australian Government
Geoscience Australia



ROYALTIES
FOR REGIONS

Crustal architecture of the Archean Youanmi Terrane



Ivan Zibra
GSWA

Part B: how does the system work?

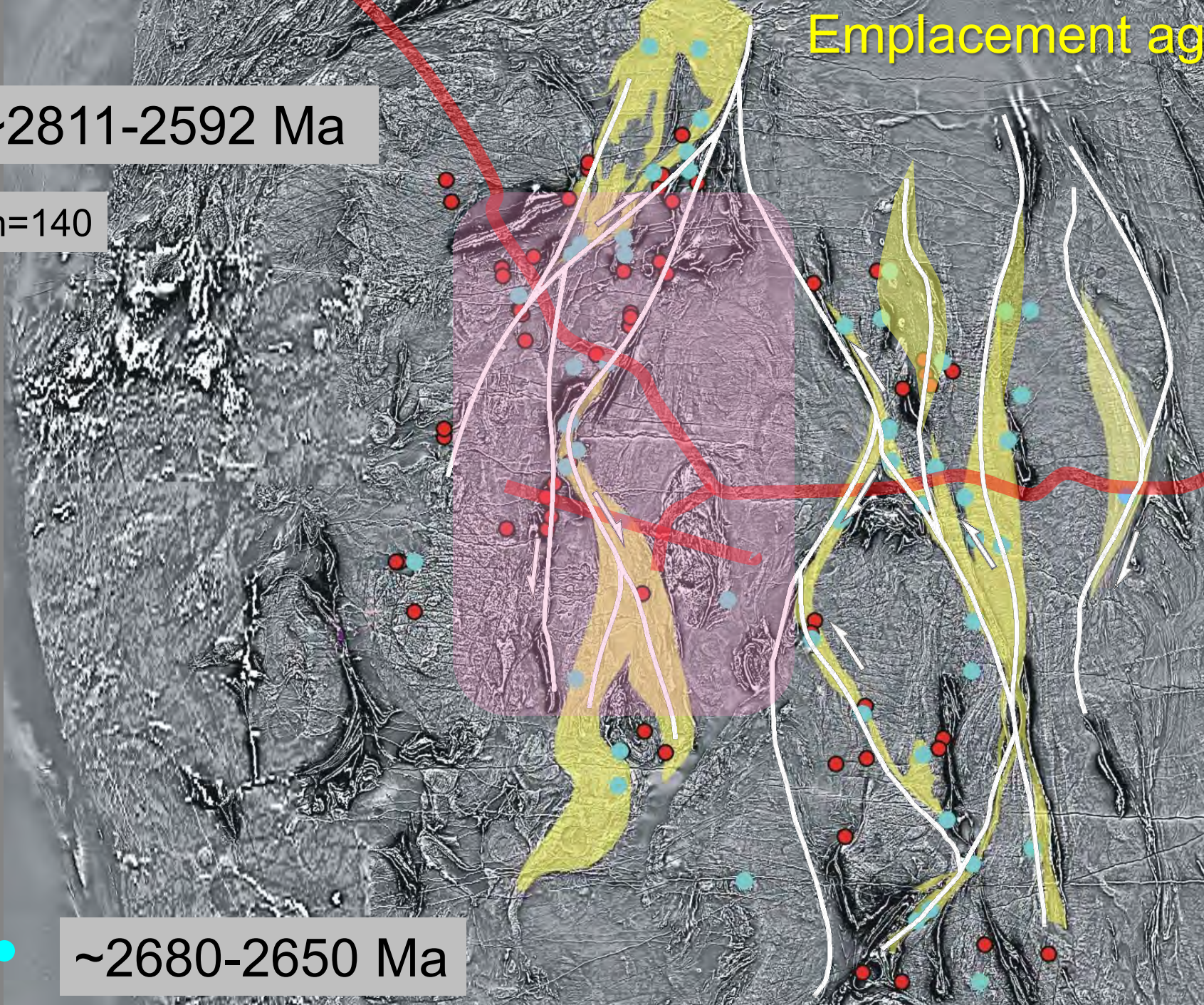


Emplacement ages

~2811-2592 Ma

n=140

~2680-2650 Ma





Part A: two sets of structures

Part B: transpression & magmatism





THREE MAIN COMPLEXES

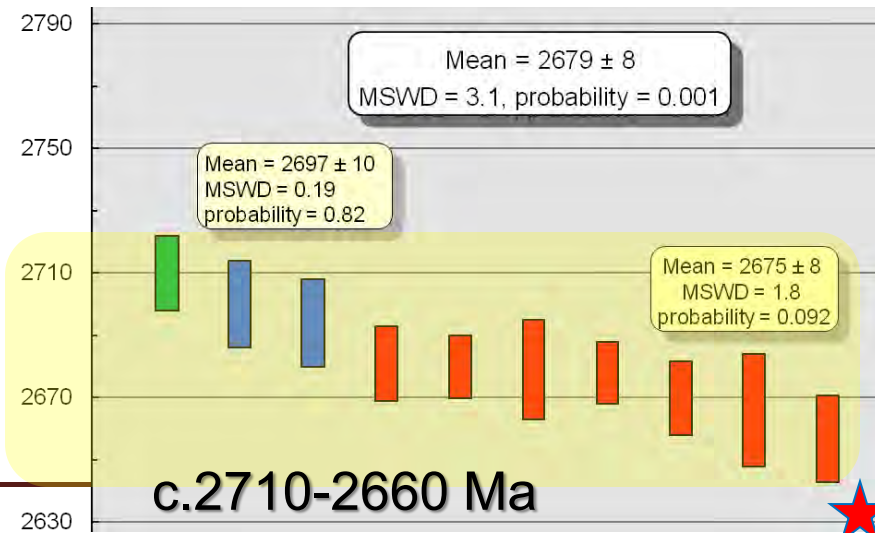
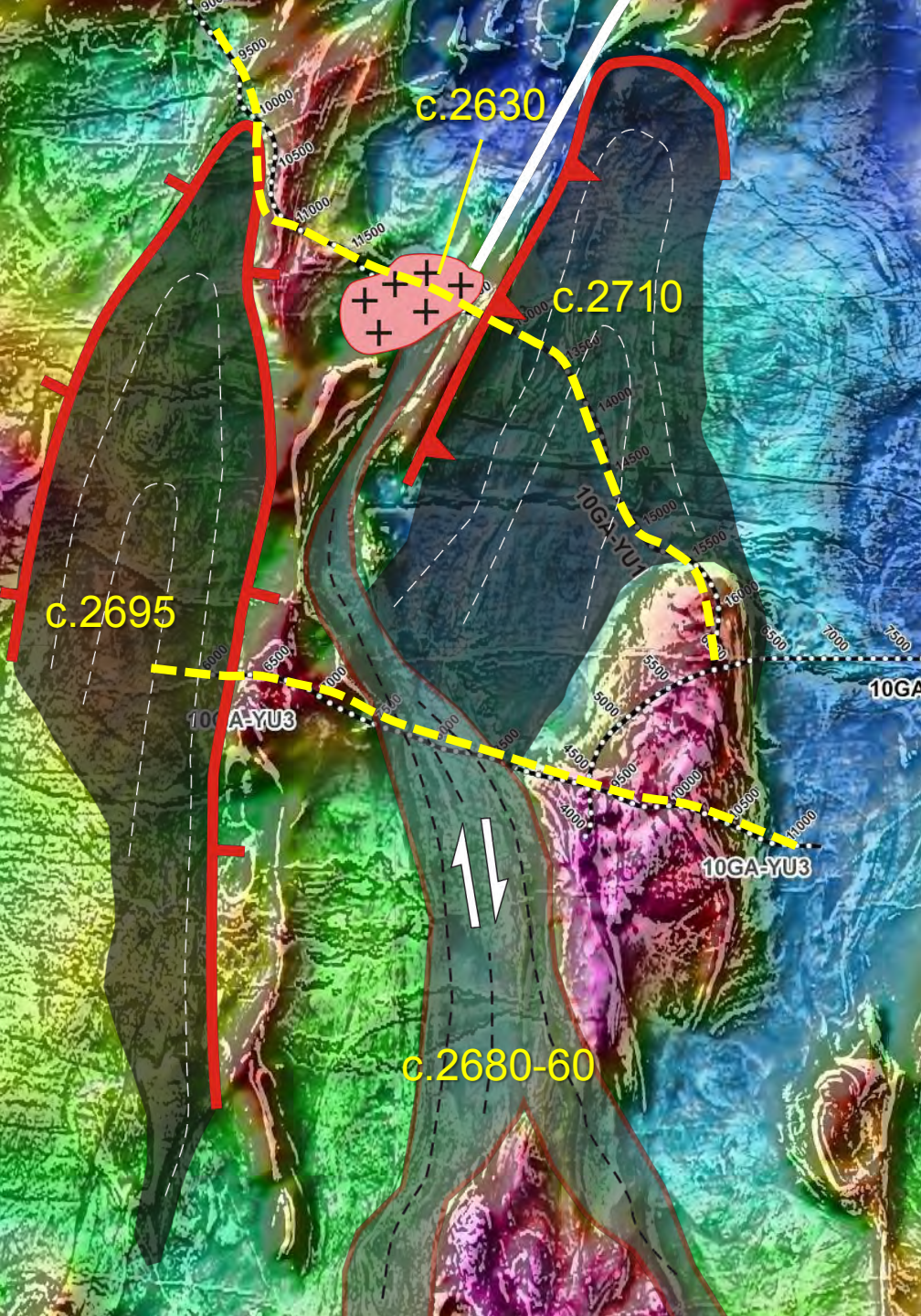


1st ORDER COMMON FEATURES:

- N-S elongate bodies (a.r. 3:1 – 10:1)
- N-S magmatic-HT solid state fabric
- Dome-up kinematics
- Greenstones: Met. & Def decreases rapidly away from granites

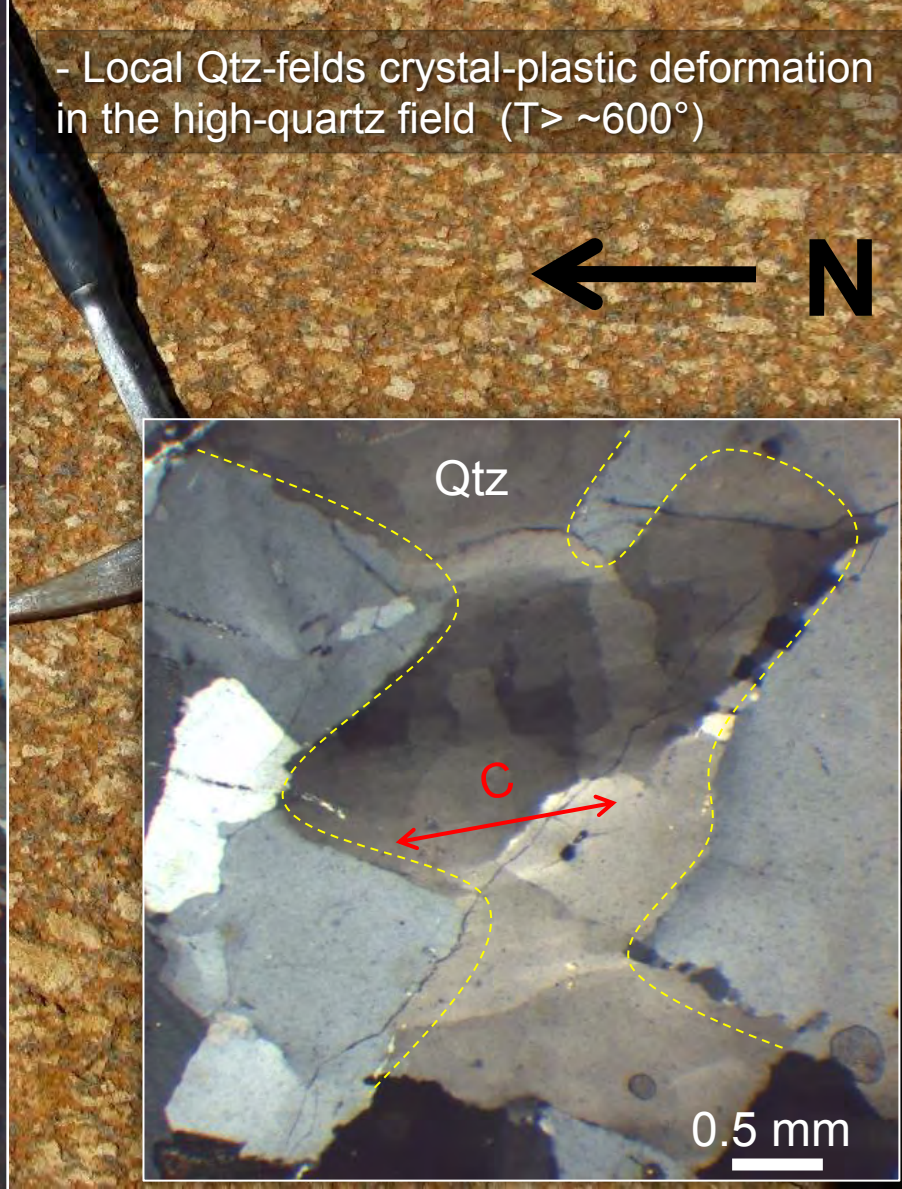
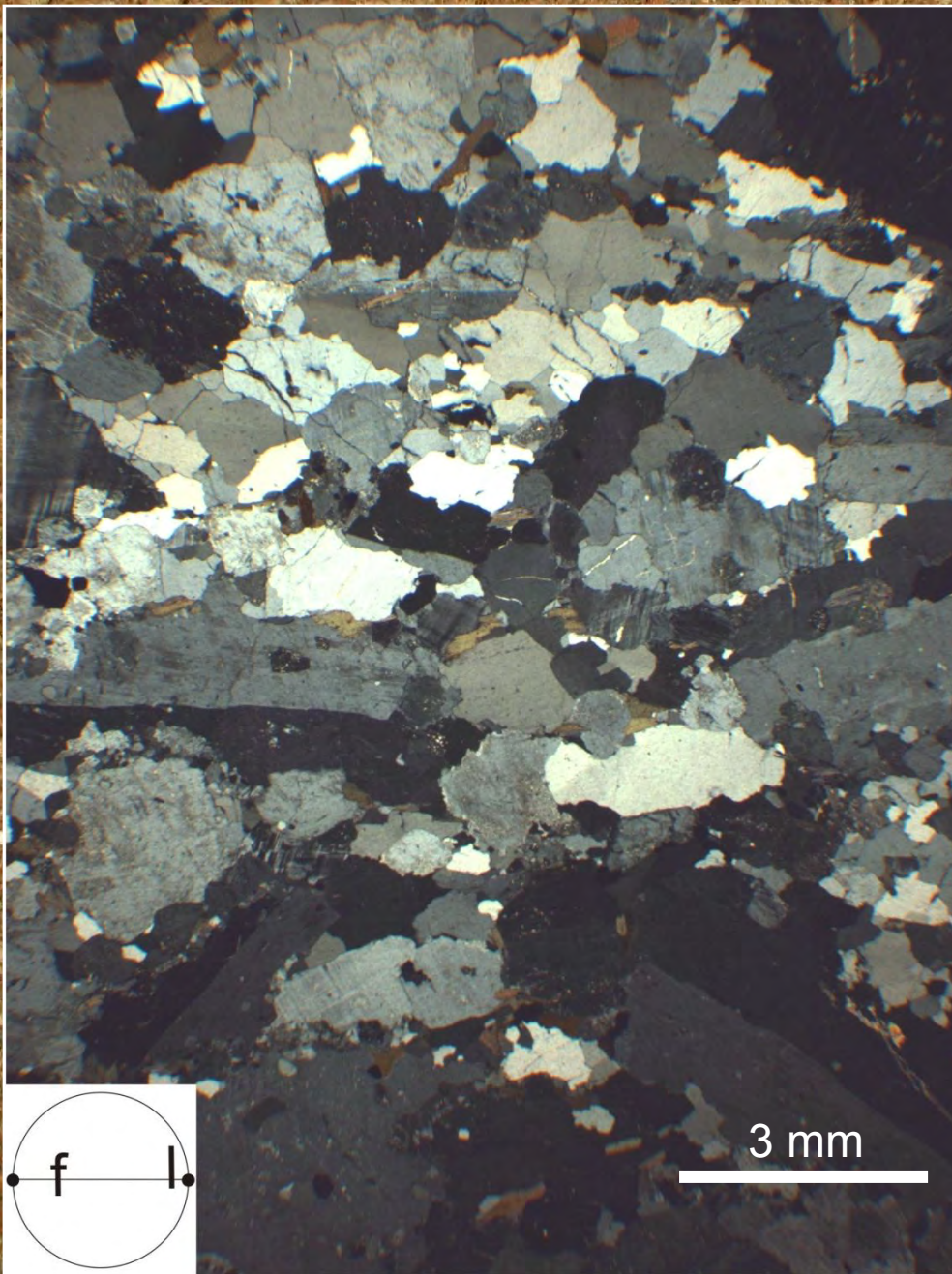
DIFFERENCES:

-  - Little or no retrogression
-  - Association with migmatites
-  -wrench tectonics
-  -Pervasive s.state overprint

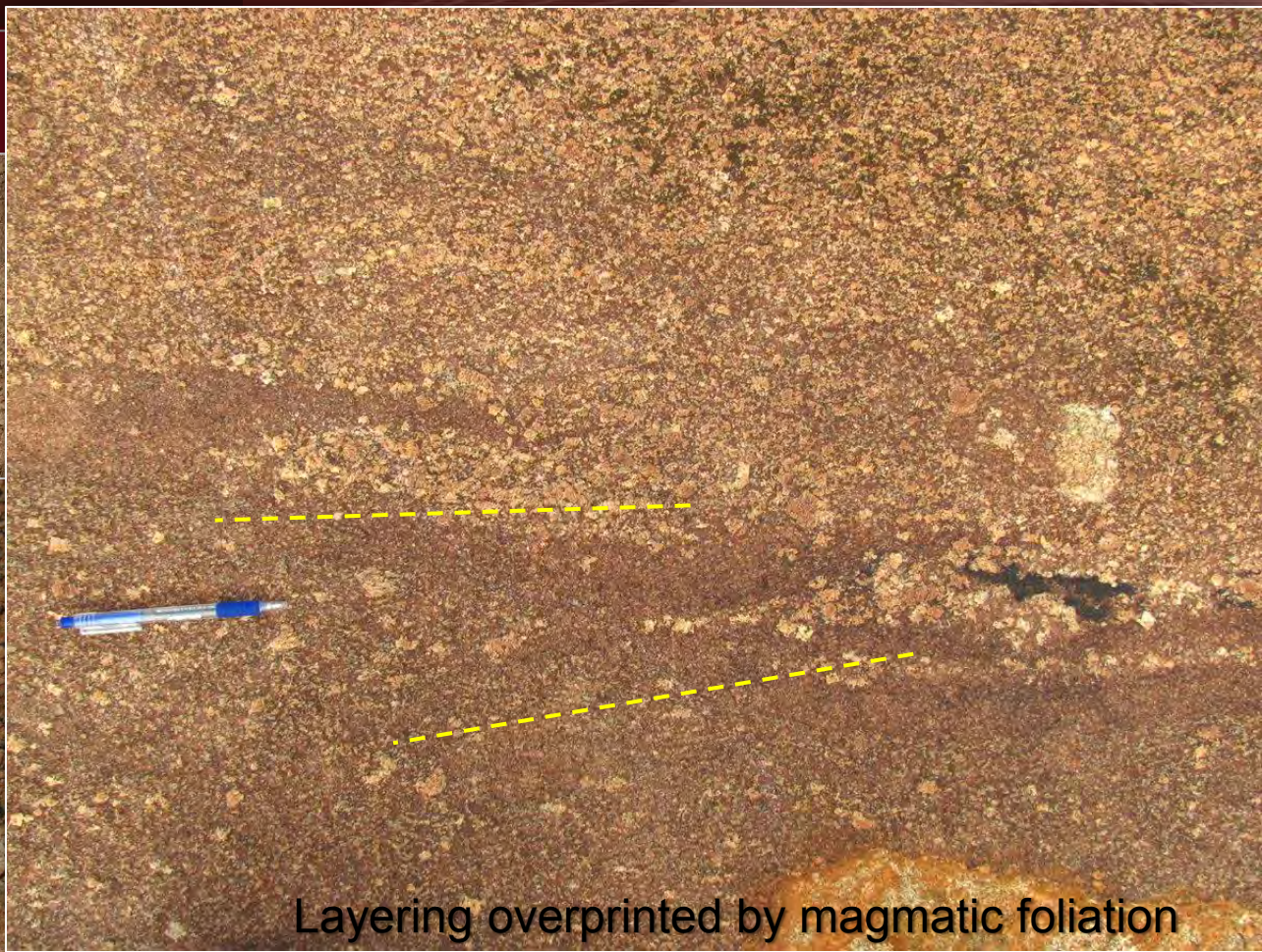
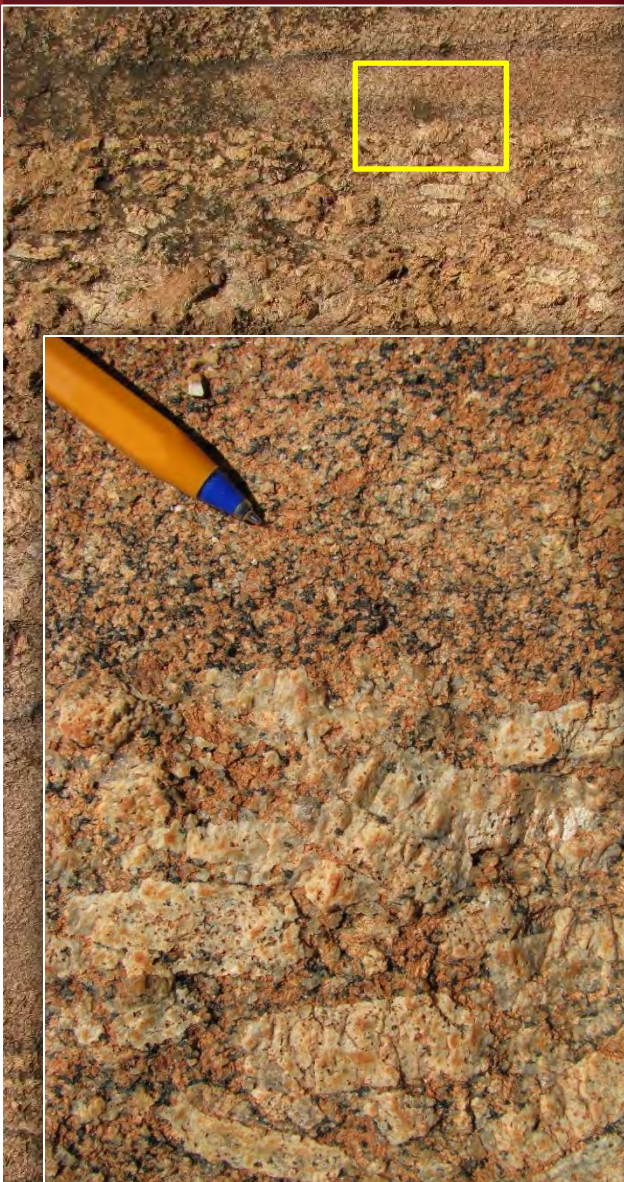


a) N-trending, steep magmatic fabric - Consistent orientation at regional scale

- Local Qtz-felds crystal-plastic deformation in the high-quartz field ($T > \sim 600^\circ$)



Compositional layering



Layering overprinted by magmatic foliation

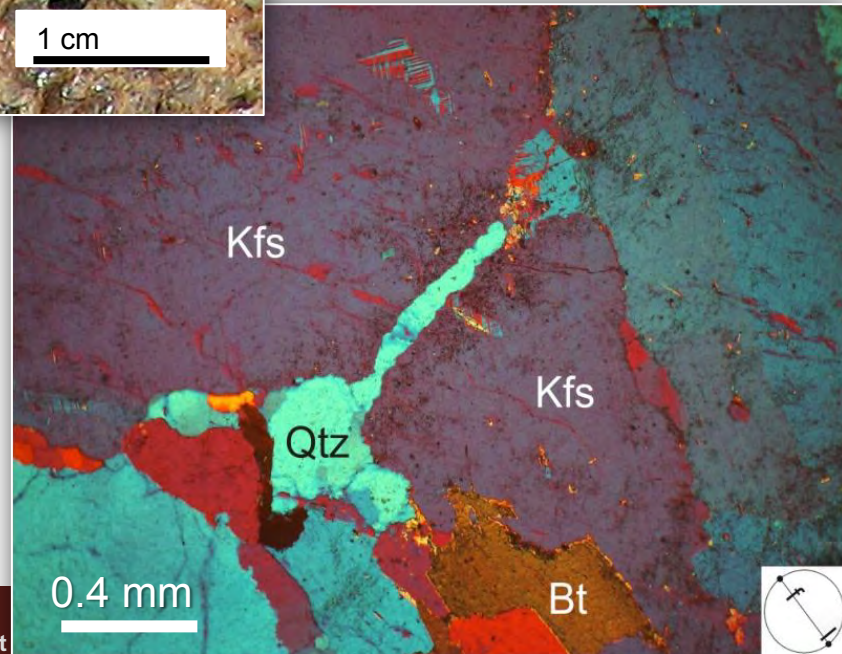


Z
X

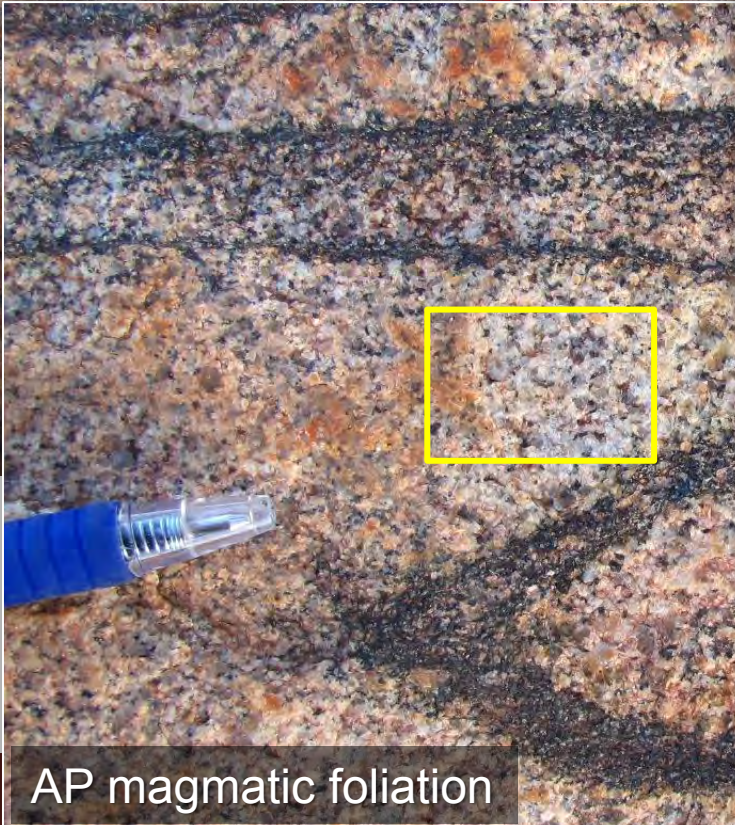
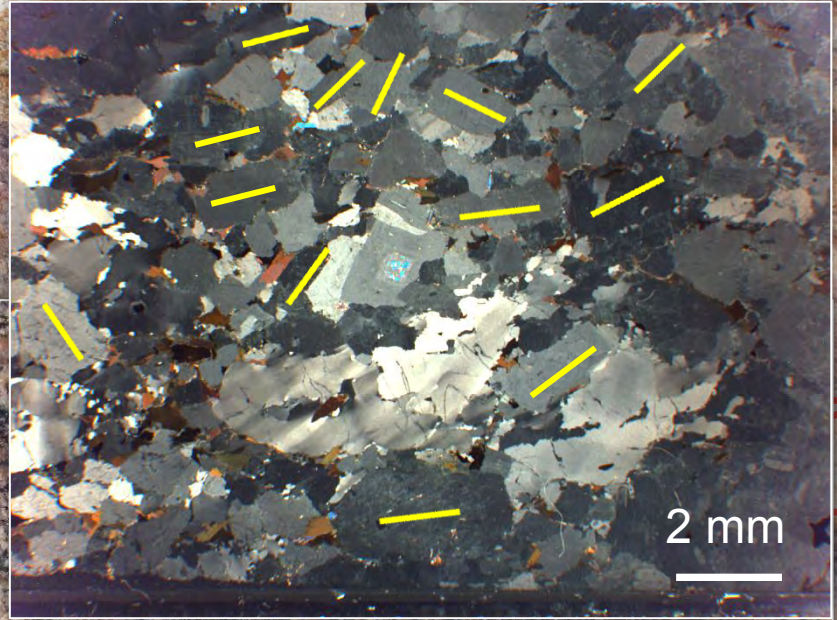
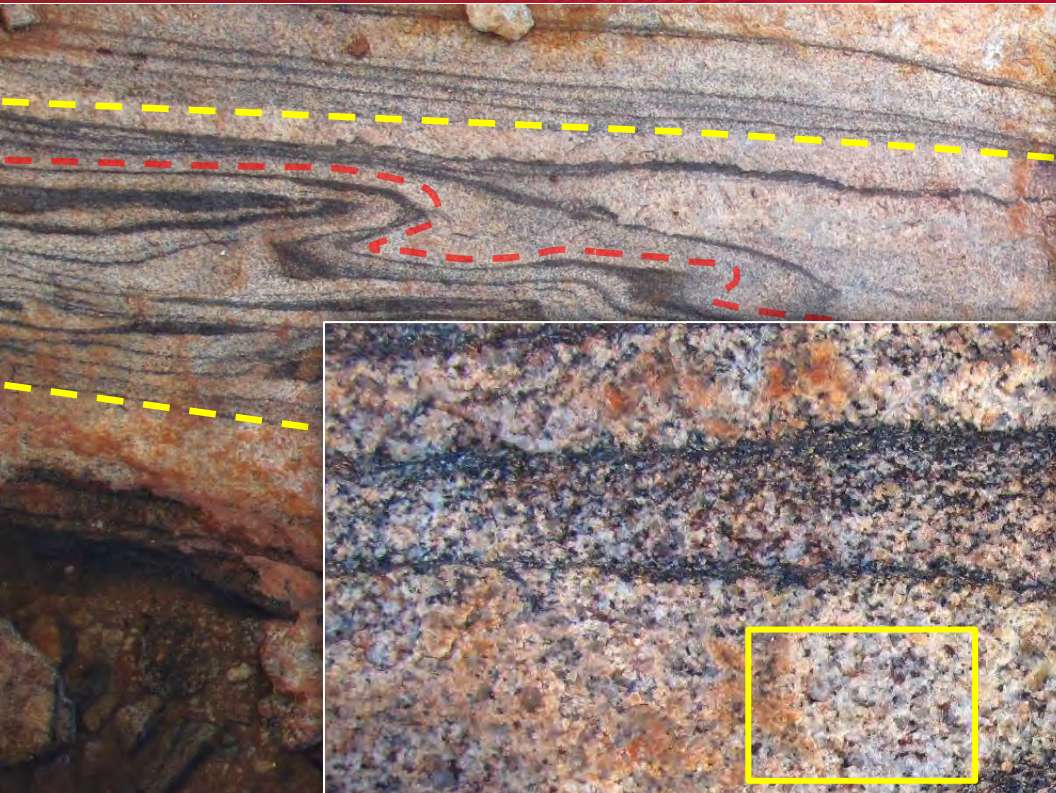
Synmagmatic brittle deformation



Fracture infill: undeformed granitic matrix

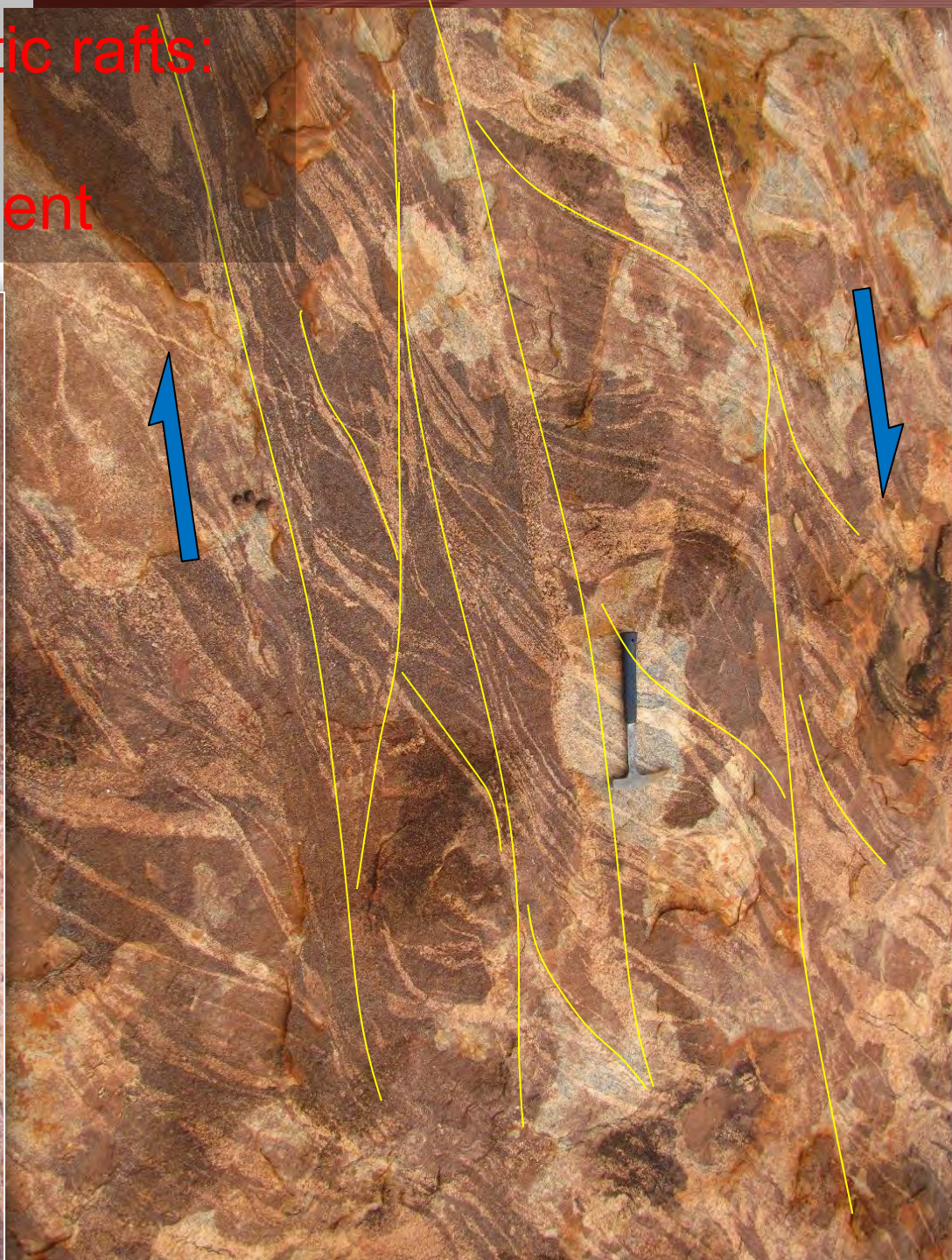


Asymmetric folds

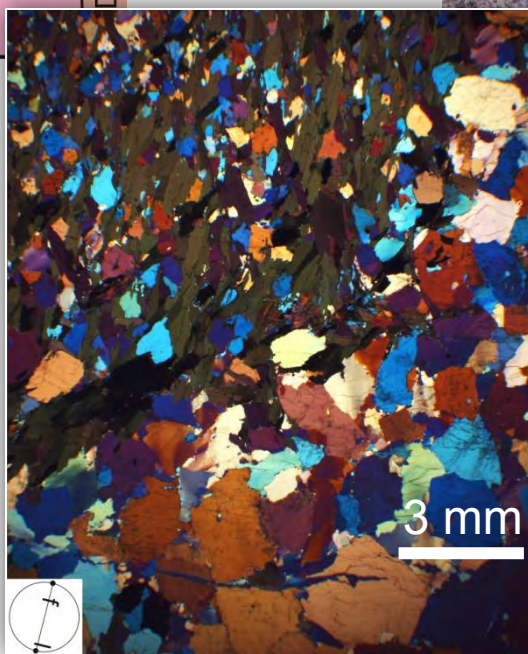
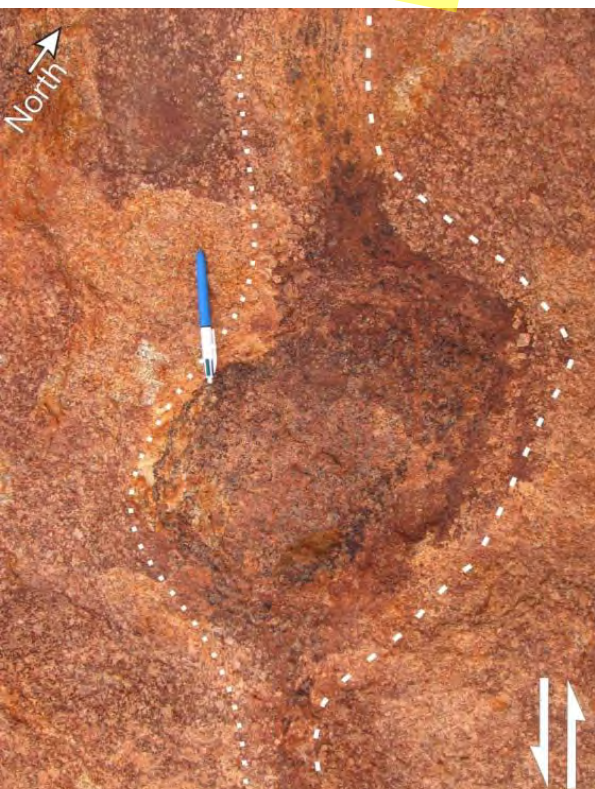
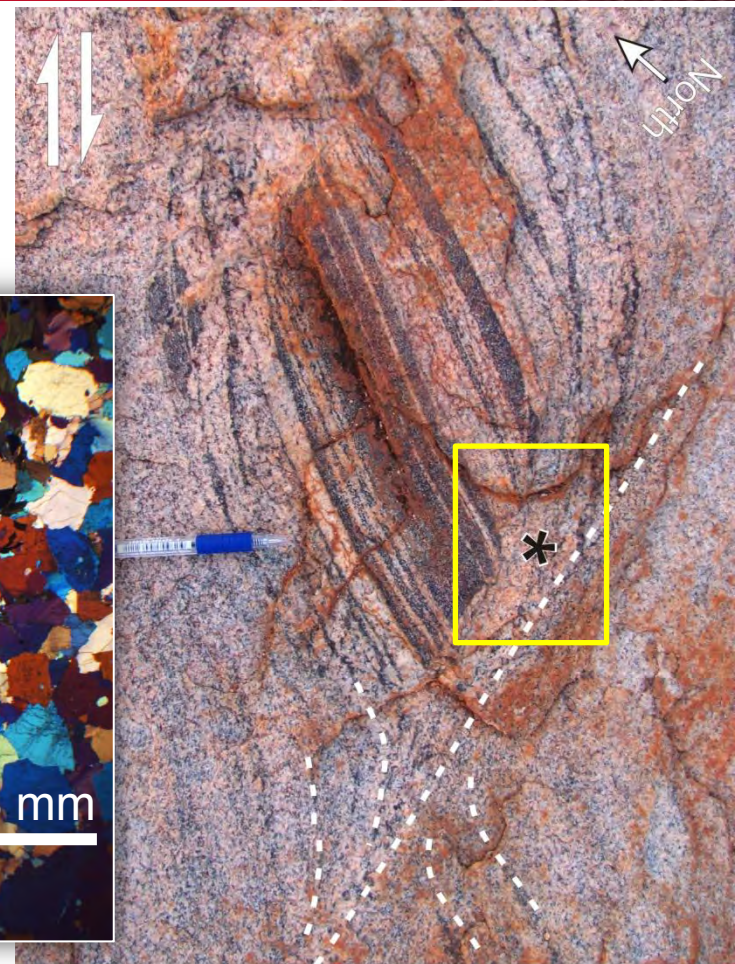
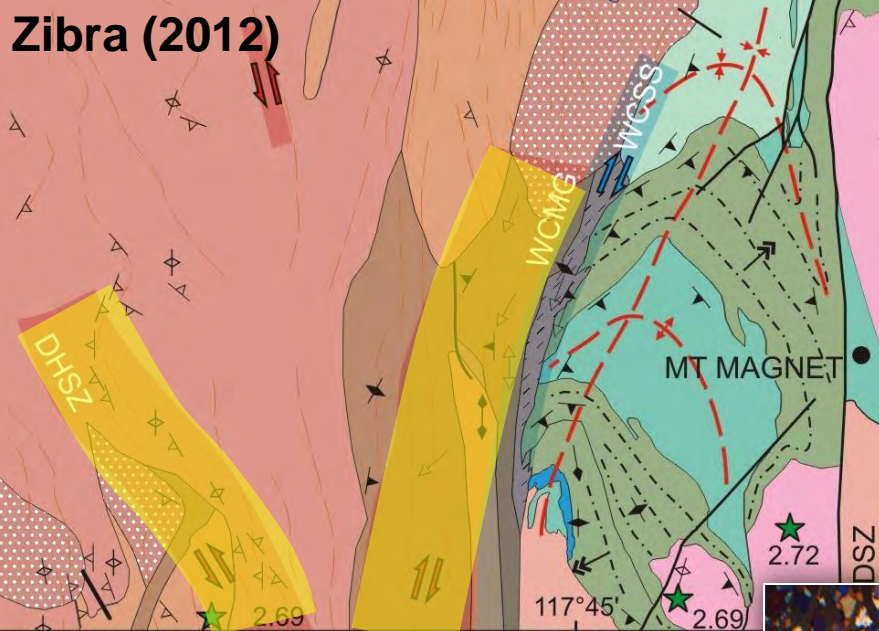


AP magmatic foliation

m.- to Km-sized migmatitic rafts:
syn-def. partial melting
during granite emplacement



Km-scale synmagmatic shear zones

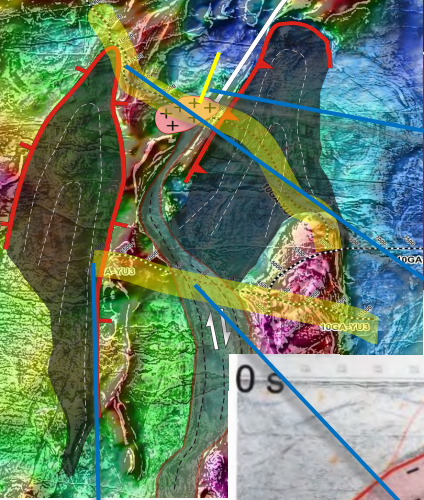


Magmatic fabric in the matrix

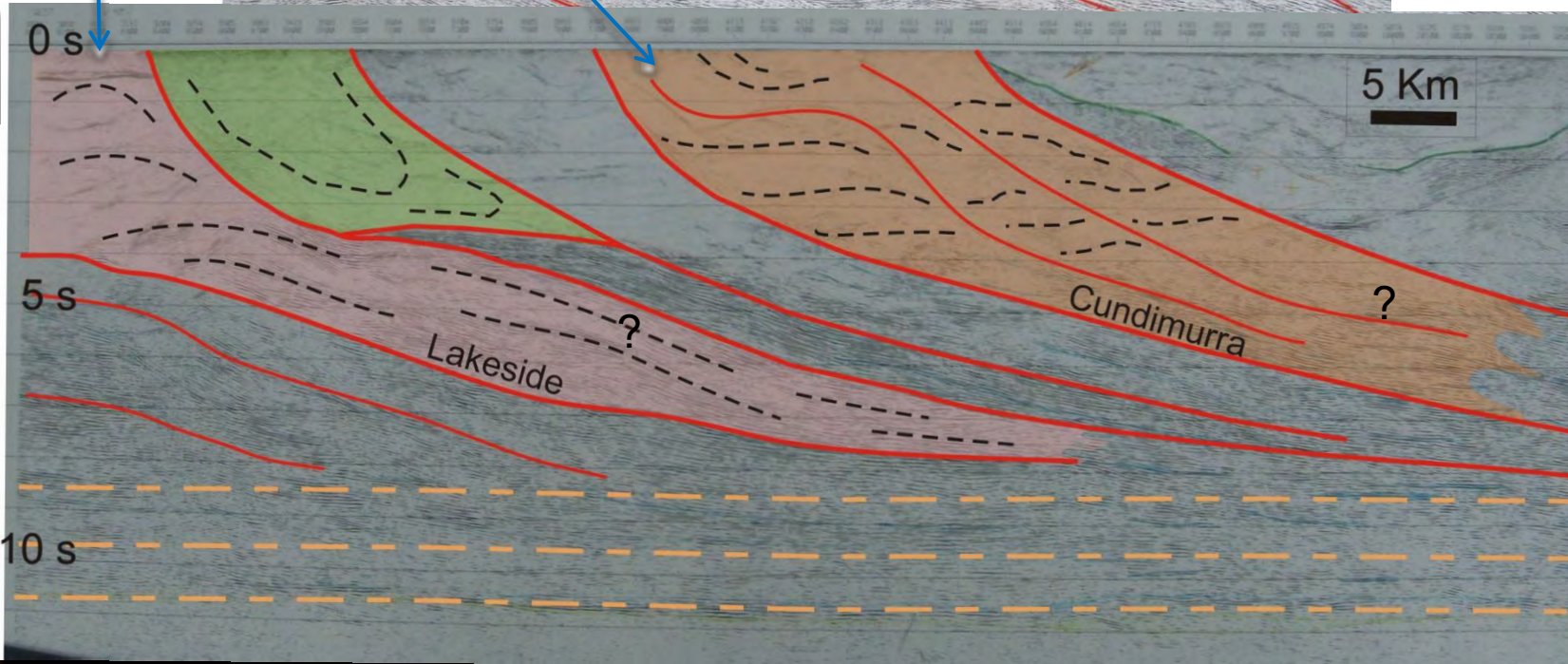
(a) Asymmetrically sheared xenoliths & rafts

3D pluton geometry

- long, narrow wedge-shaped plutons
- bounded by shear zones
- rooted in the lower crust?



Post-kinematic sill





Part A: two sets of structures

Part B:

transpression & magmatism

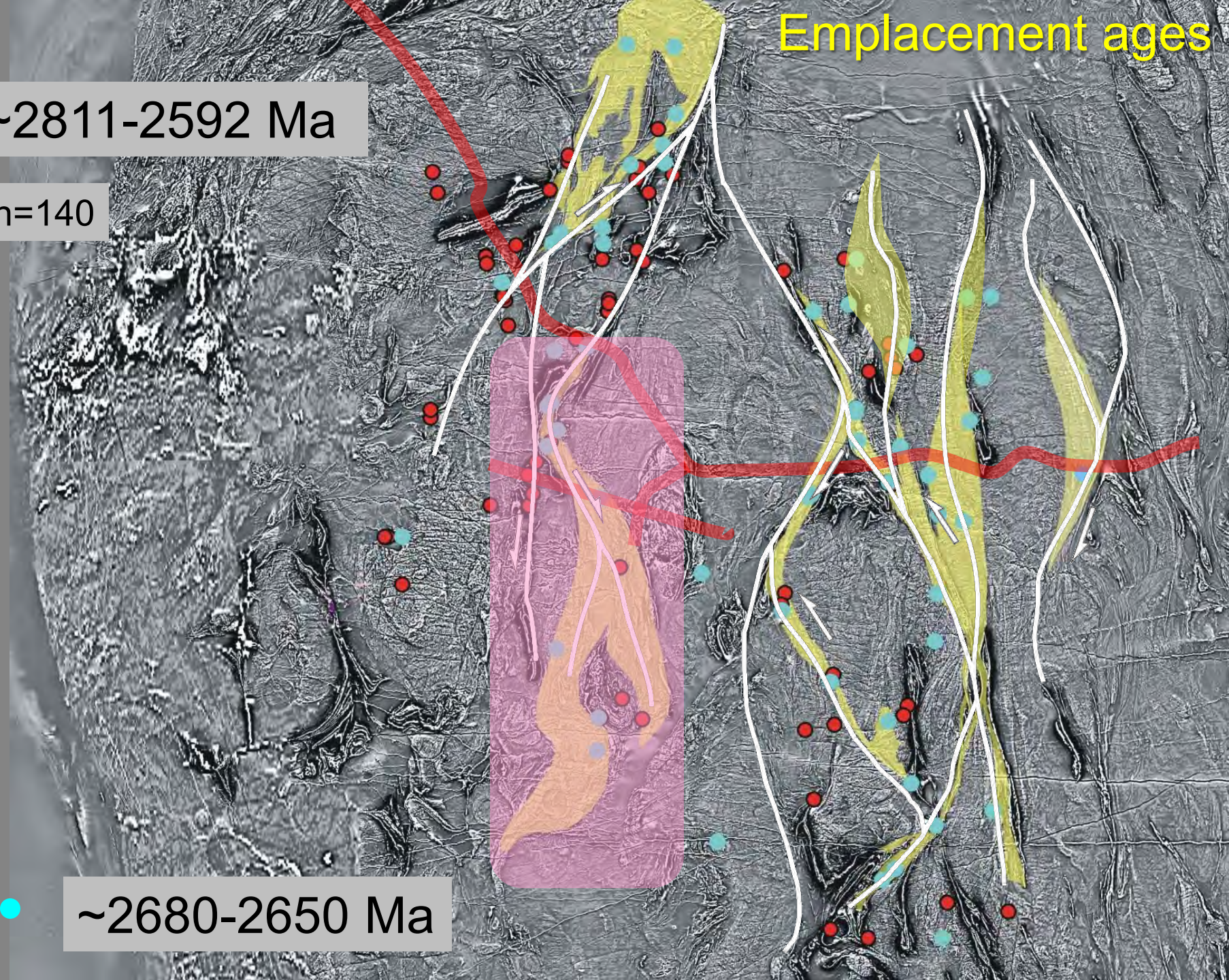


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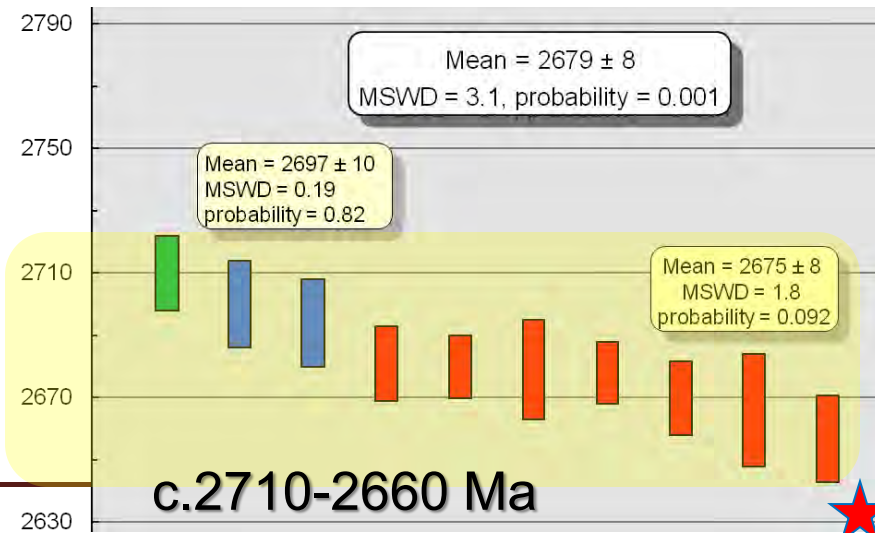
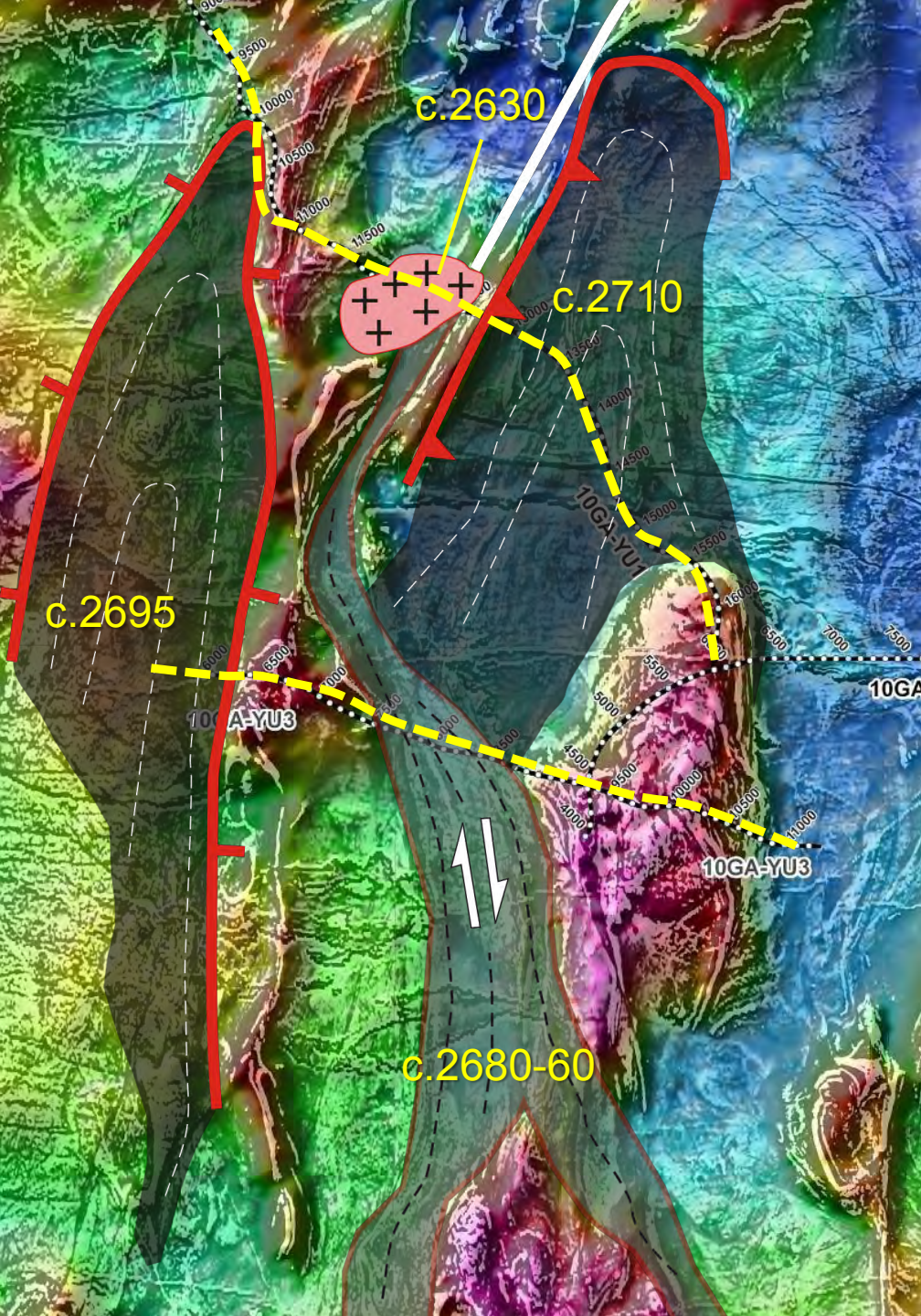


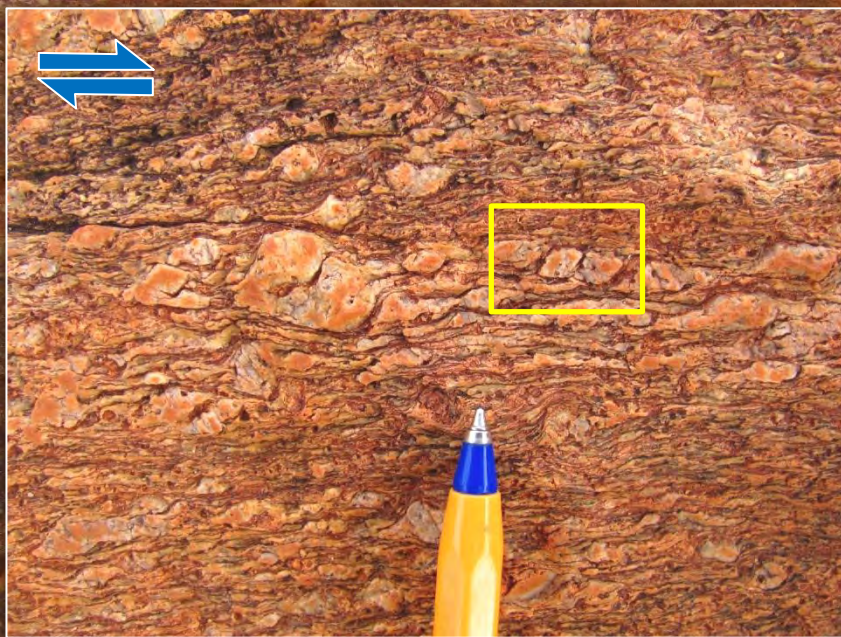
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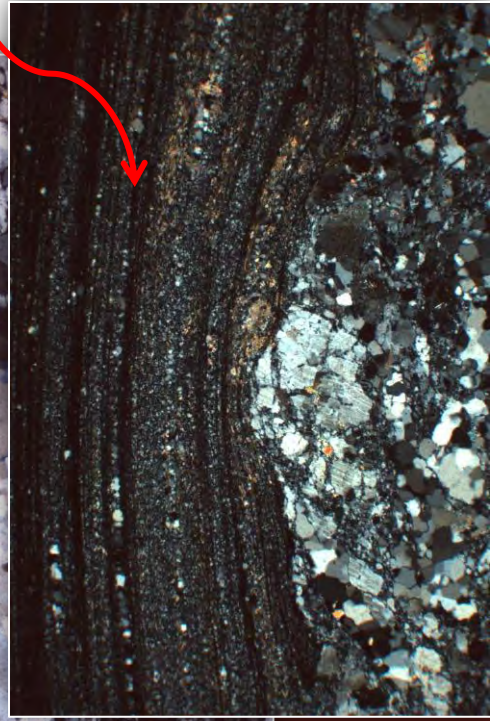
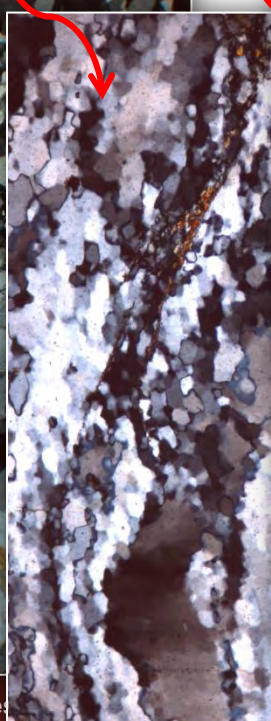
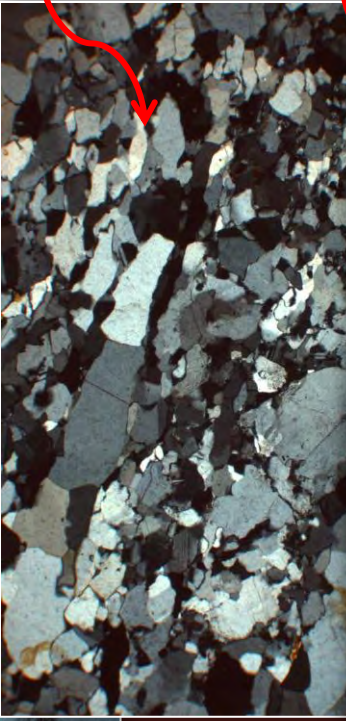
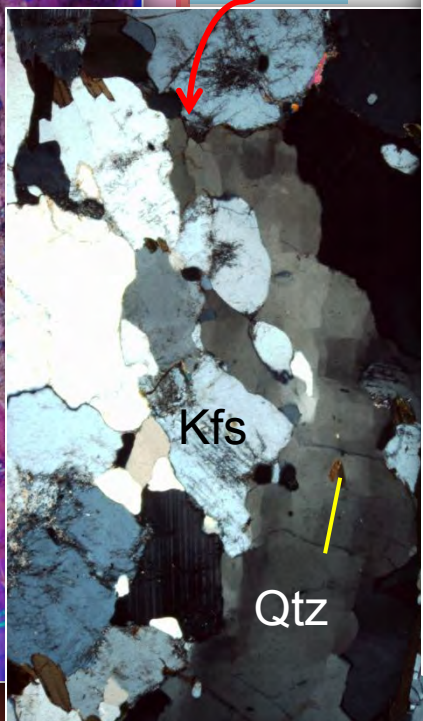
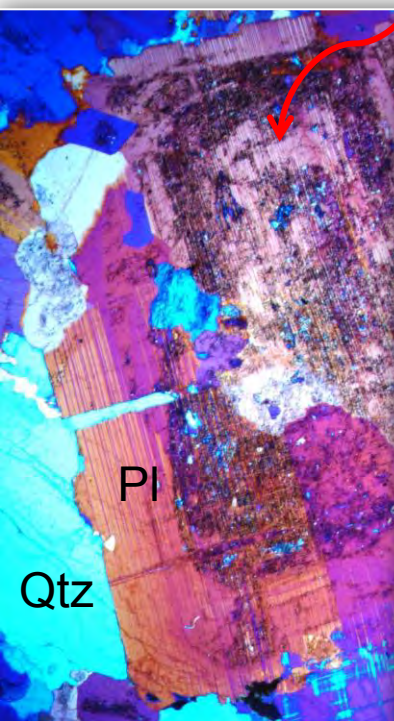
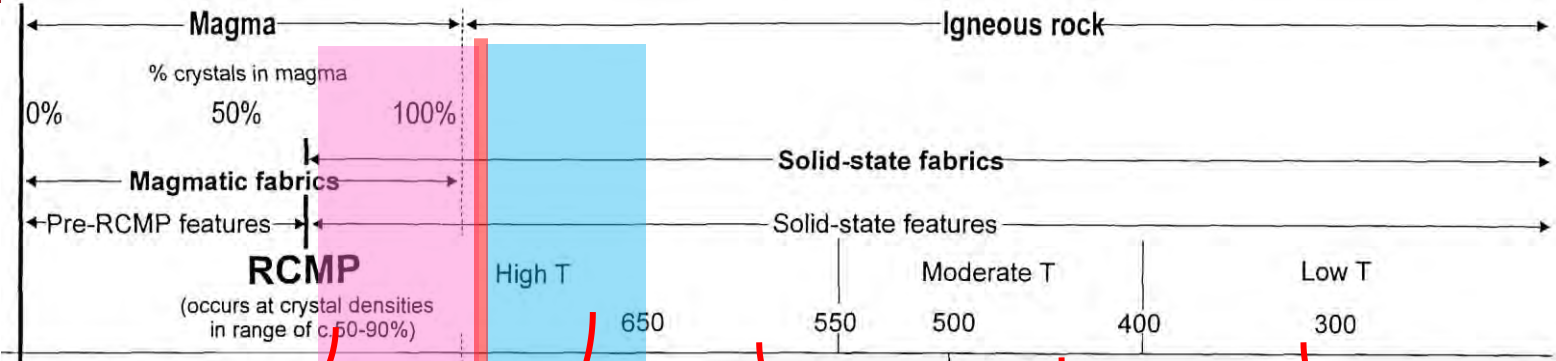
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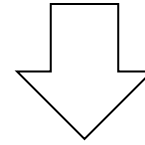
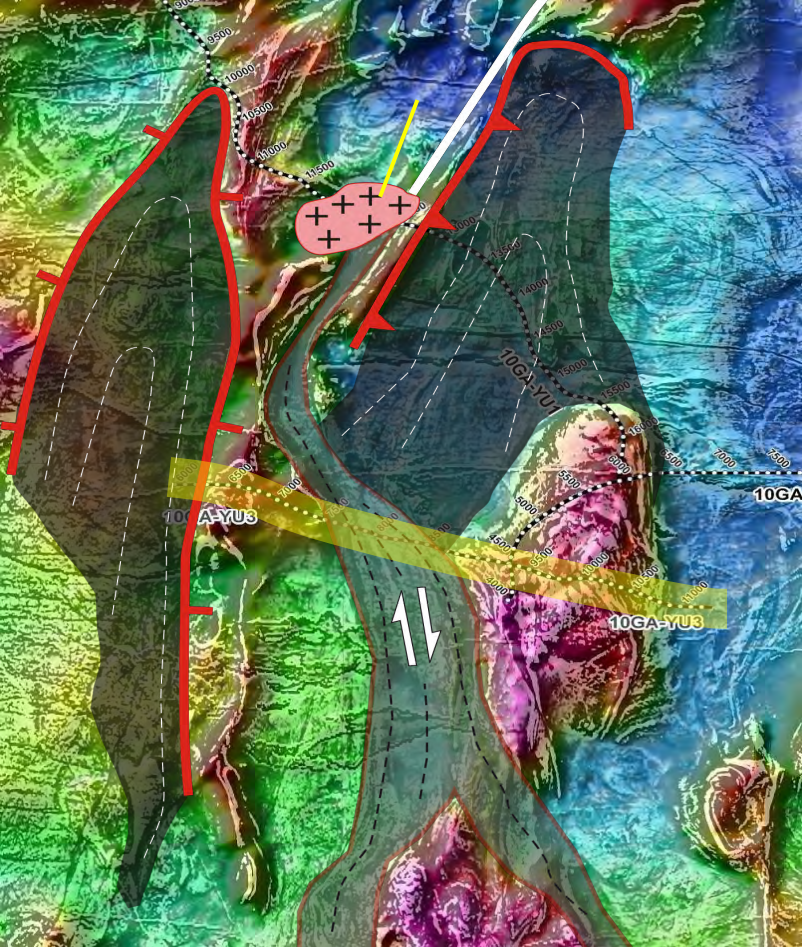


Cundimurra Granite –
 syndeformational transition Sub-magmatic → HT solid-state flow
 locally preserved. Down-temperature deformation to ~ 350°C



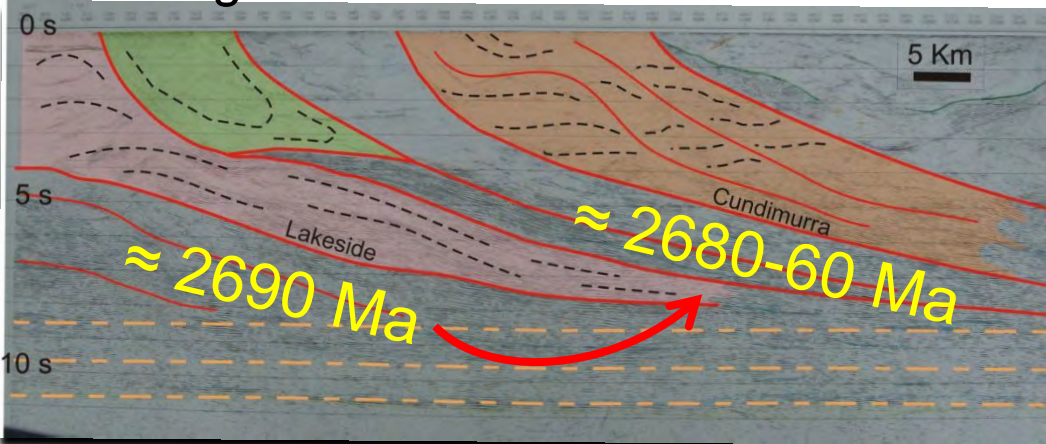


Melt-induced strain localization in adjacent structures

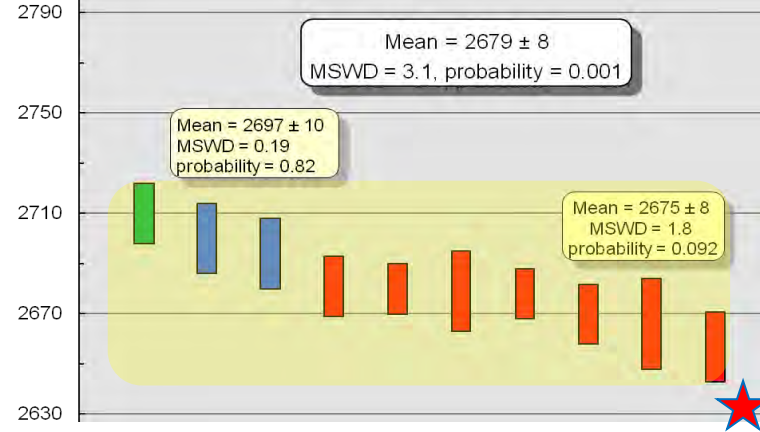


Preservation of emplacement Structures in the older plutons

M.Magnet



Magmatic activity ≈ 40 Ma





SUMMARY:

- Transpression-dominated shear zones
- Transpression active (assisted) pluton emplacement
- Preliminary geochemistry (similar to Lakeside Pluton):

→ DEEP CRUSTAL MAGMA SOURCE

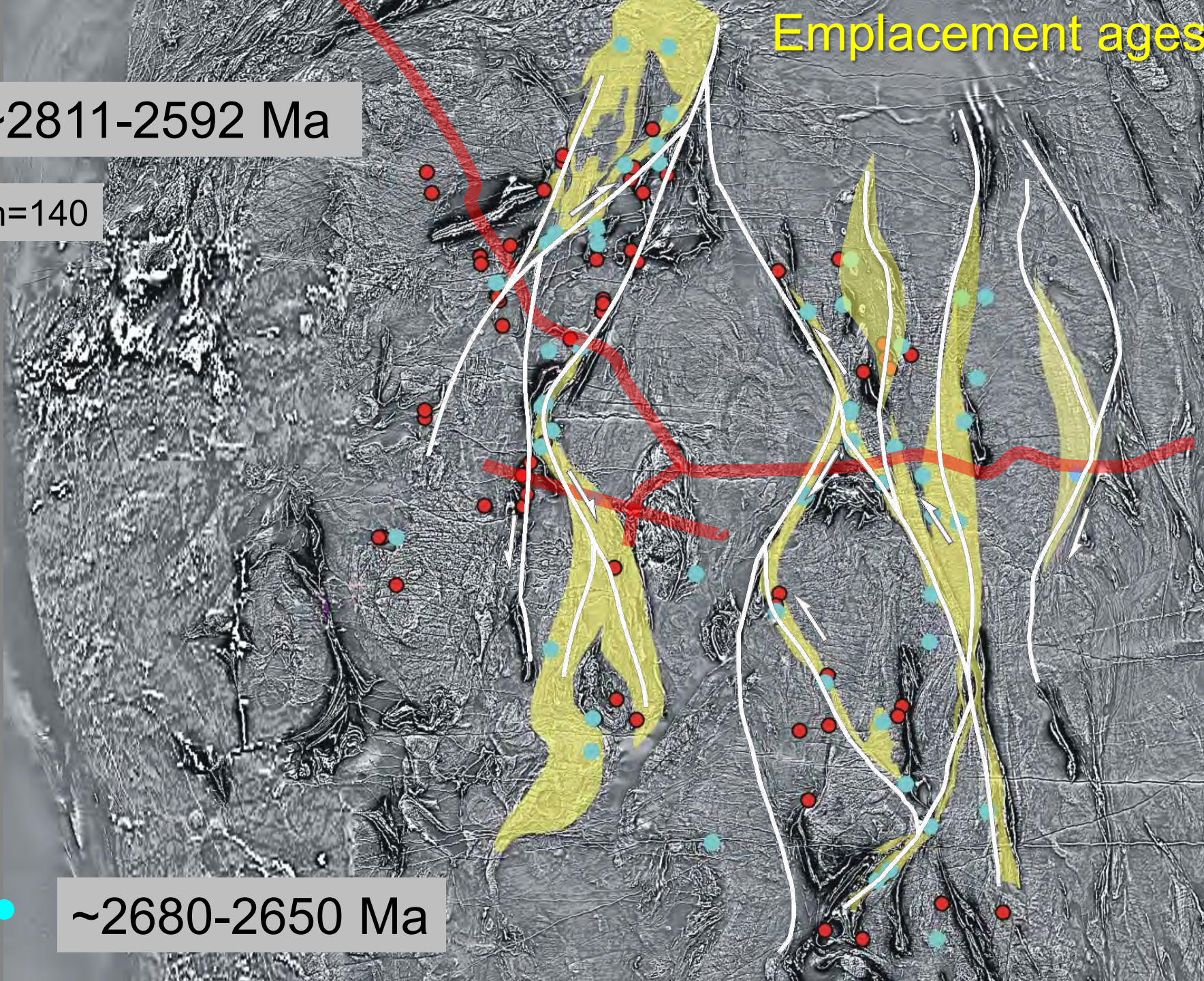
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Thanks