

# Geometric complexity of the Woodroffe Thrust (Musgrave Ranges, central Australia) recorded in hanging wall Al-silicates-bearing peraluminous gneisses and hosted pseudotachylytes

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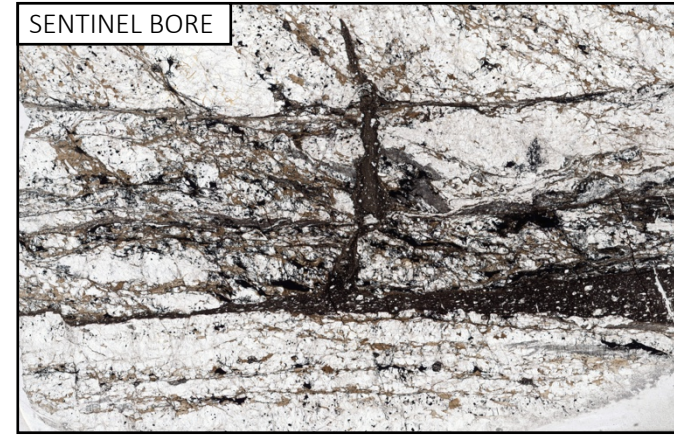
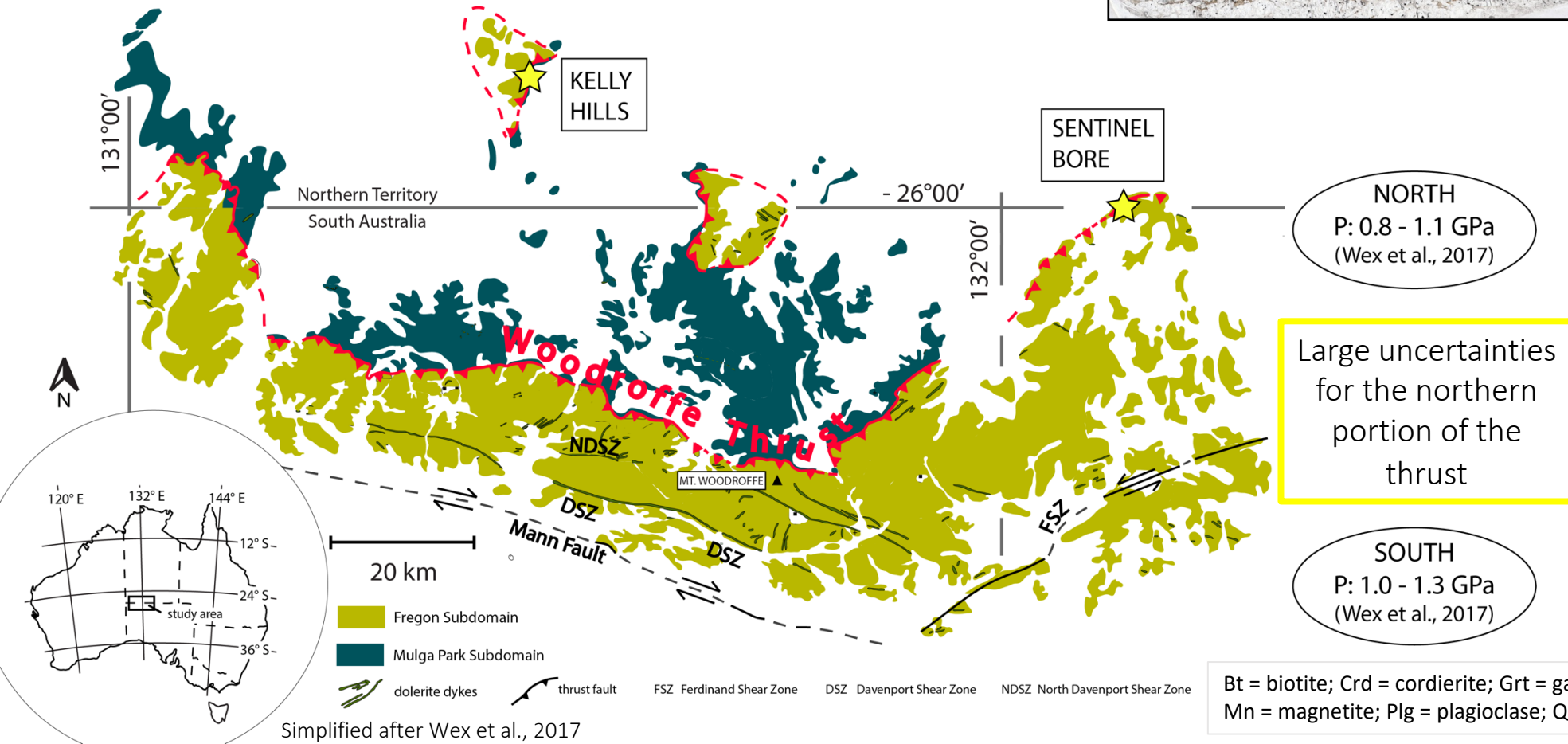
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# The Woodroffe Thrust

- Developed during the Petermann Orogeny (630- 520 Ma)
- Hosts the largest volume of deep-seated tectonic pseudotachylytes in the world
- Shallowly S-dipping according to previous estimates (relatively small P variations along dip)



Samples from the northern outcrops:  
Pseudotachylyte-bearing peraluminous gneisses

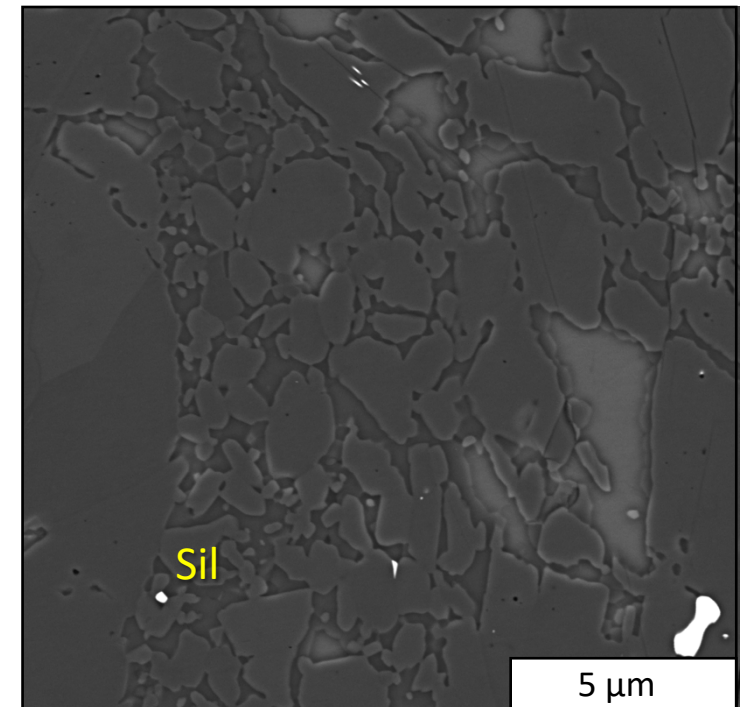
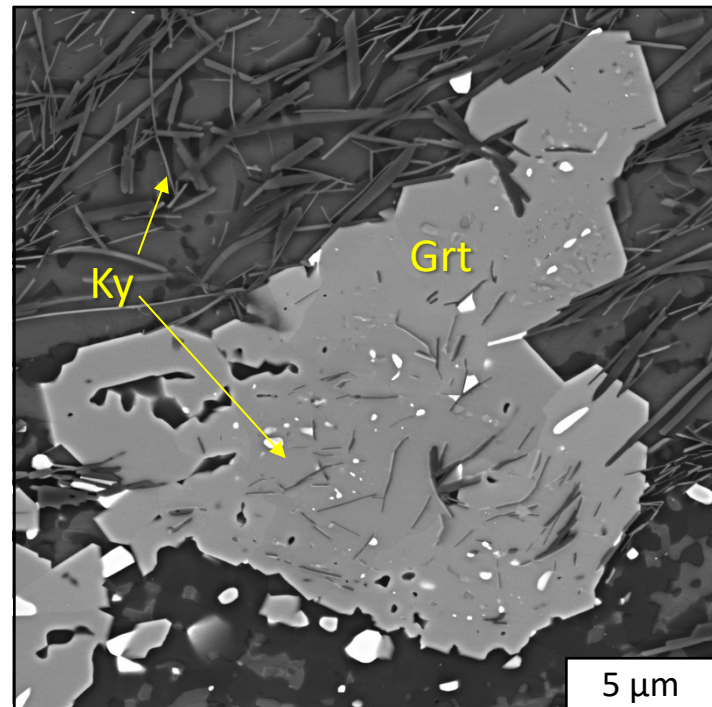
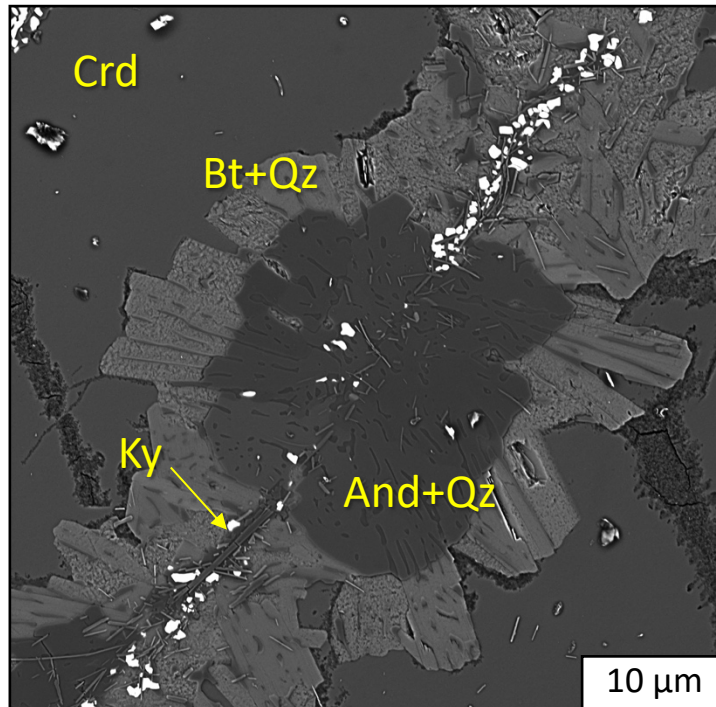
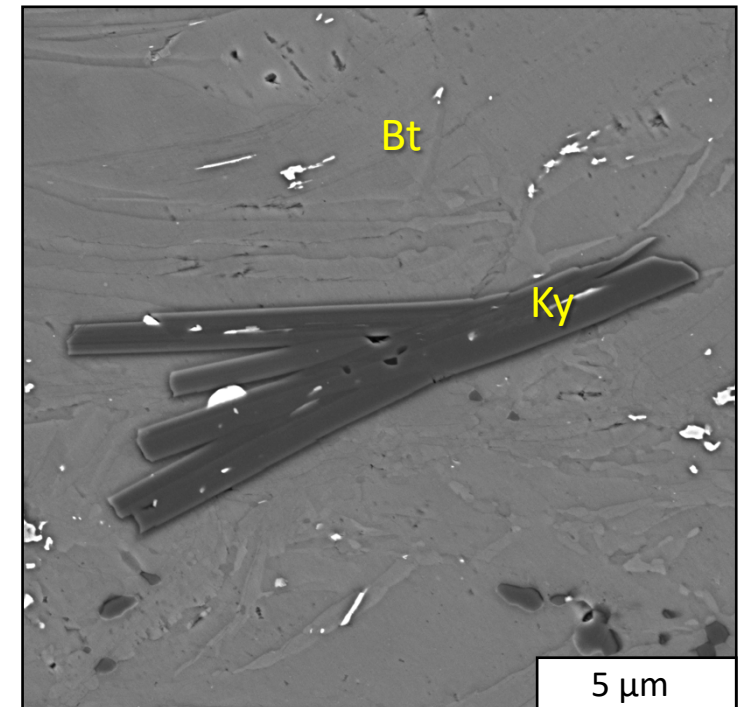
Mineralogy:  
*Qz - Plg - Kfs - Crd*  
*Sil - Ky - Grt - Bt - Mn*

Bt = biotite; Crd = cordierite; Grt = garnet; Kfs = K-feldspar; Ky = kyanite; Mn = magnetite; Plg = plagioclase; Qz = quartz; Sil = sillimanite



# Sentinel Bore: host rock

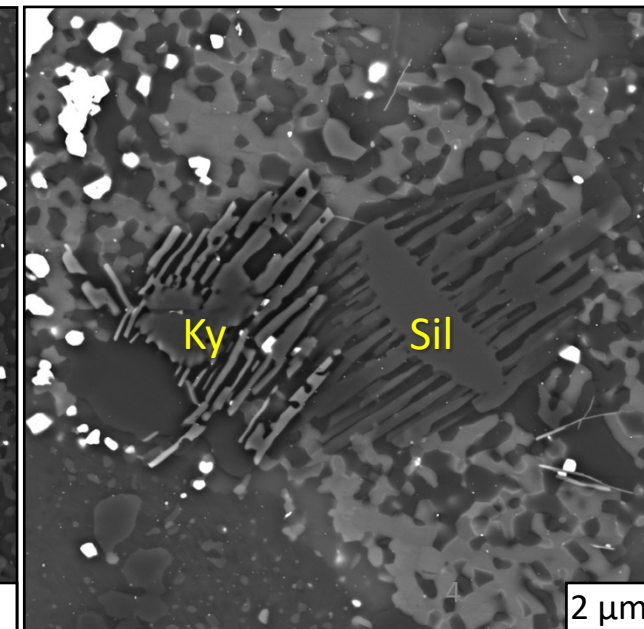
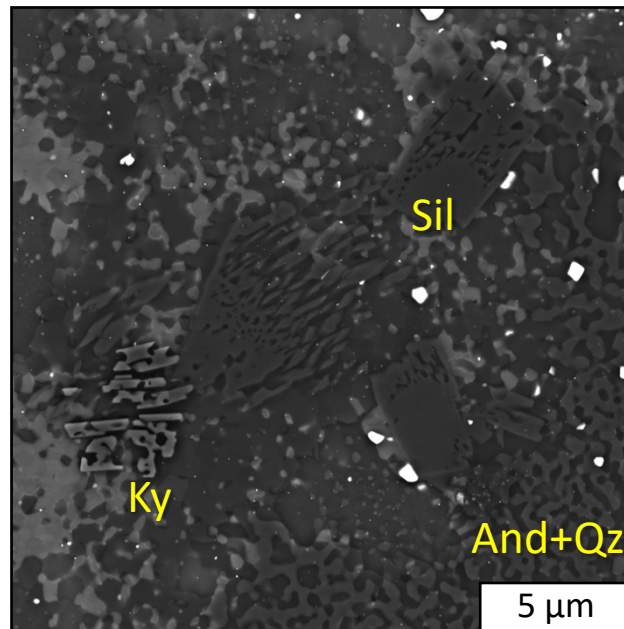
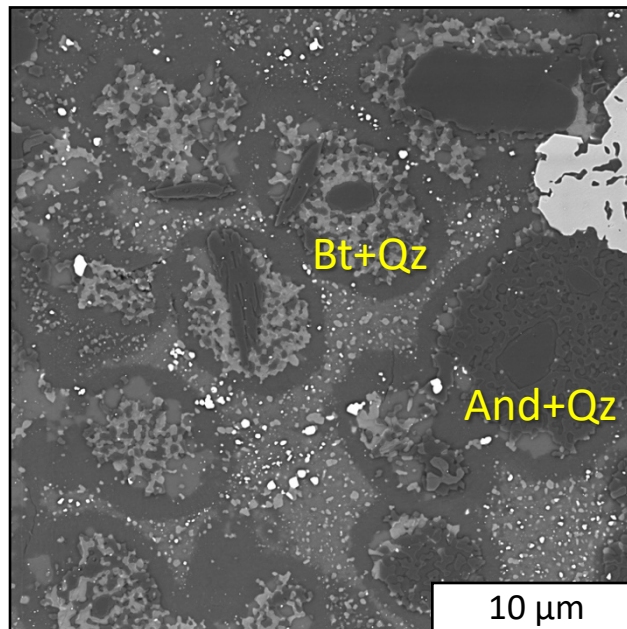
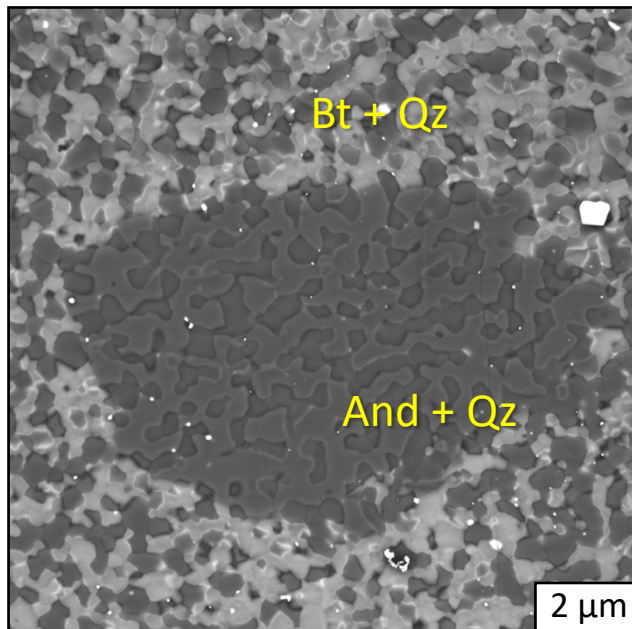
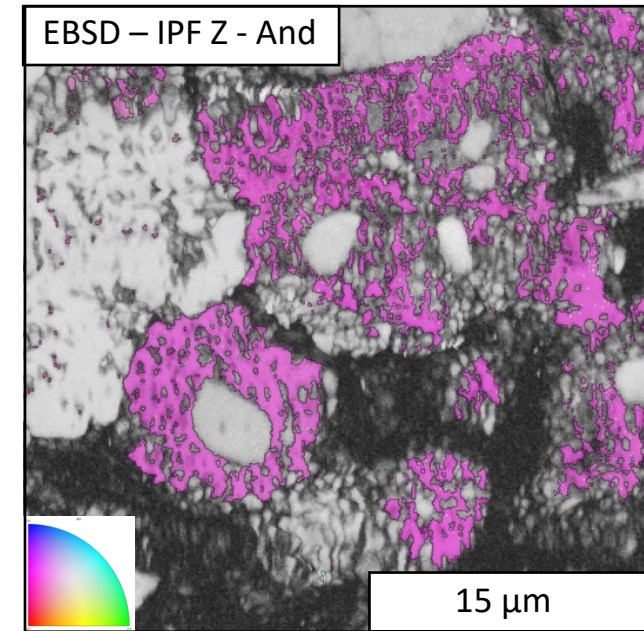
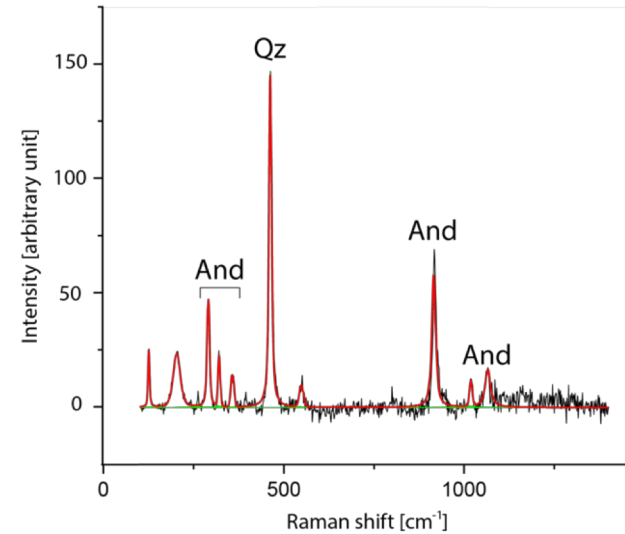
- Breakdown of *Crd*  $\rightarrow$  *And* (& *Ky*) + *Qz* + *Bt* + *Mn*
- Static growth of *Ky*
- Metastable *Sil*
- Later growth of *Grt* (includes *Ky*)





# Sentinel Bore: pseudotachylyte

- *And* (replaced by *Bt*) + *Qz* aggregates rimmed by *Plg* and *Kfs*; *Sil* microlites overgrowing *Sil* clasts; *Ky* microlites; *Grt* (*And* and *Ky* as stable polymorphs; *Sil* growth during HT stage of coseismic thermal event)

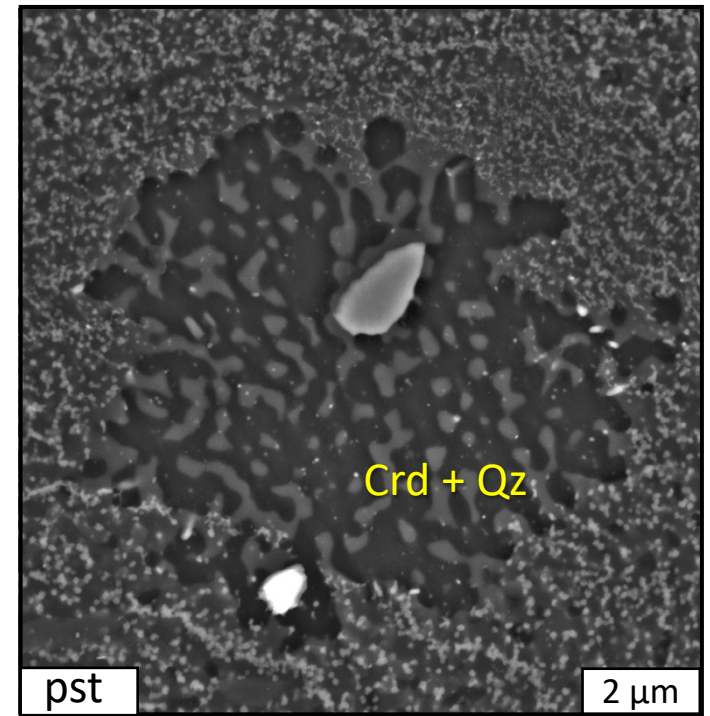
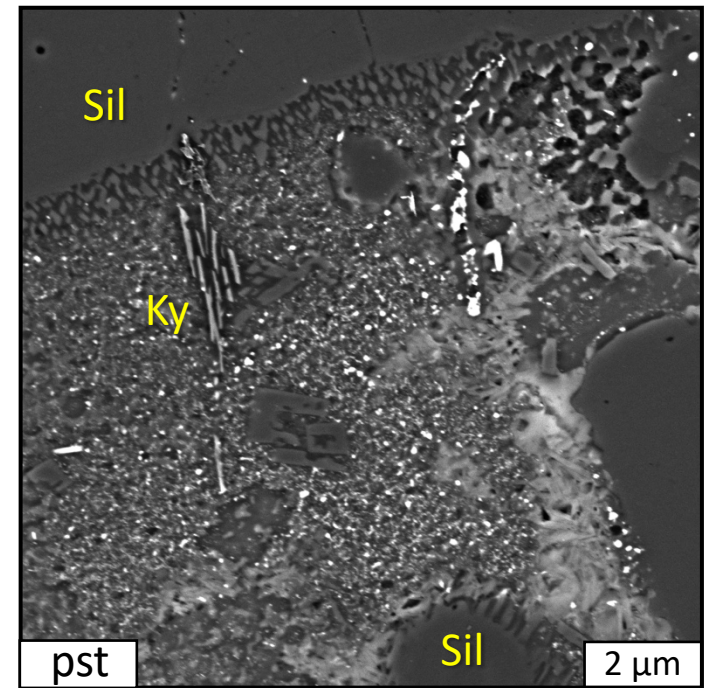
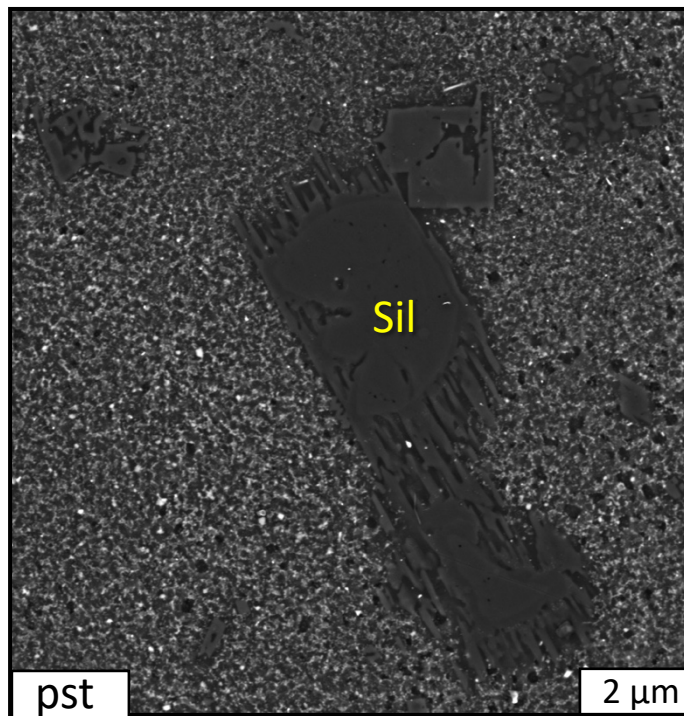
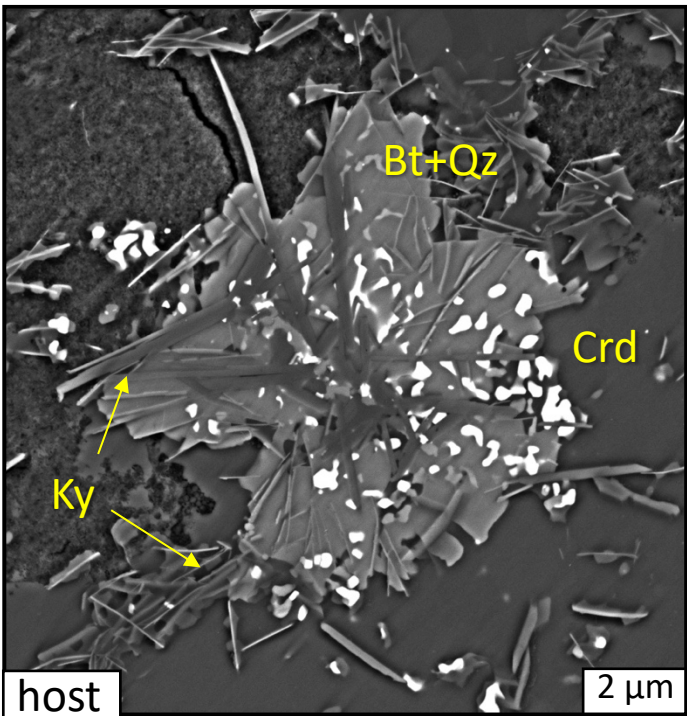




# Kelly Hills

**Host rock:** *Crd* breakdown produce *Ky* but no *And*

**Pseudotachylyte:** *Crd* microlites intergrown with *Qz*; *Sil* microlites surrounding *Sil* clasts; *Ky* microlites



# Pressure in the northern outcrops of the Woodroffe Thrust

## Sentinel Bore

coexisting *And* and *Ky*

**$P \leq 0.5$  GPa**

## Kelly Hills

absence of *And*

**$P > 0.5$  GPa**

- Significant  $P$  differences along the Woodroffe Thrust dip and strike indicate a more complex geometry than a planar S-dipping structure

