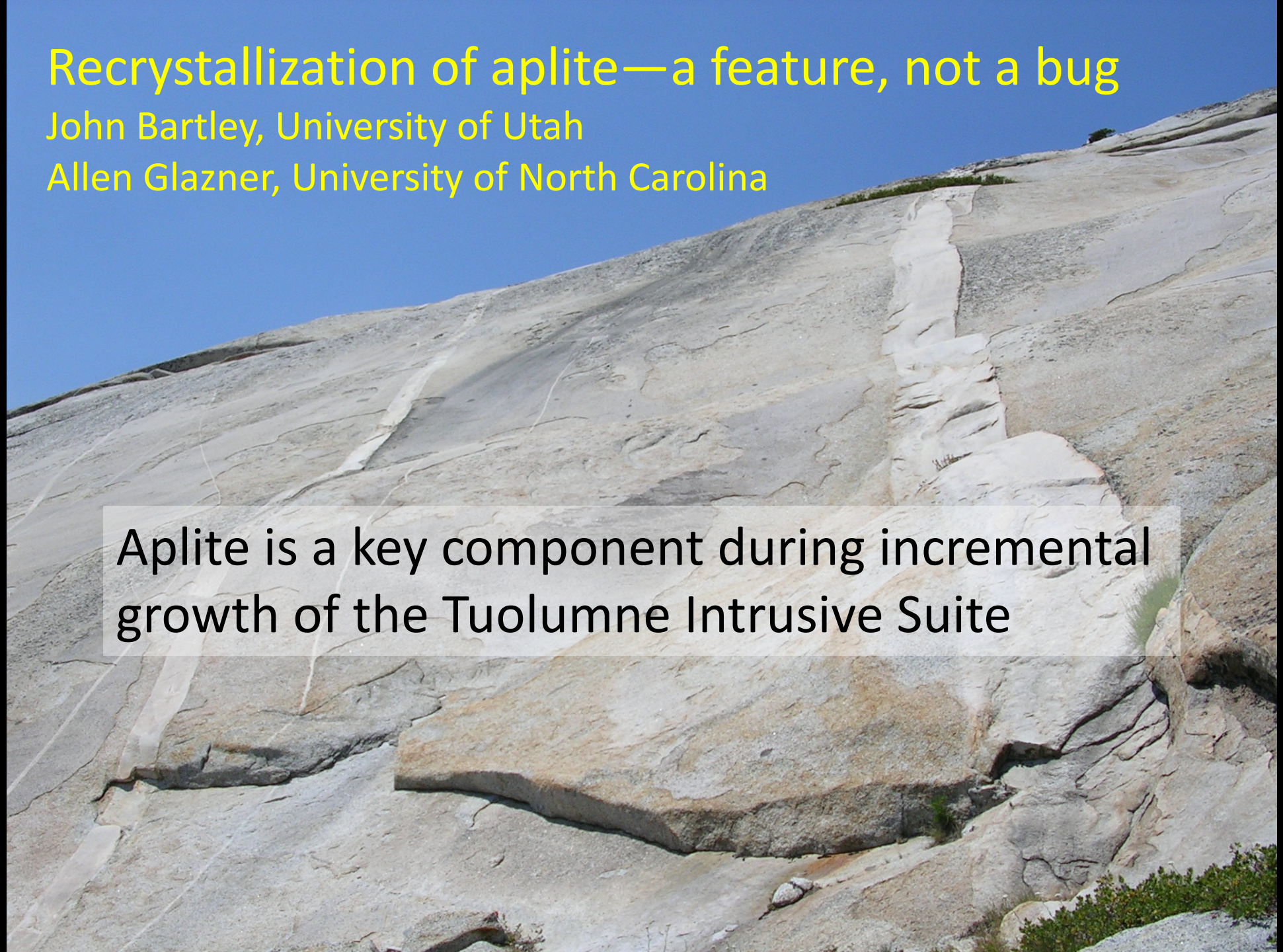
Recrystallization of aplite—a feature, not a bug

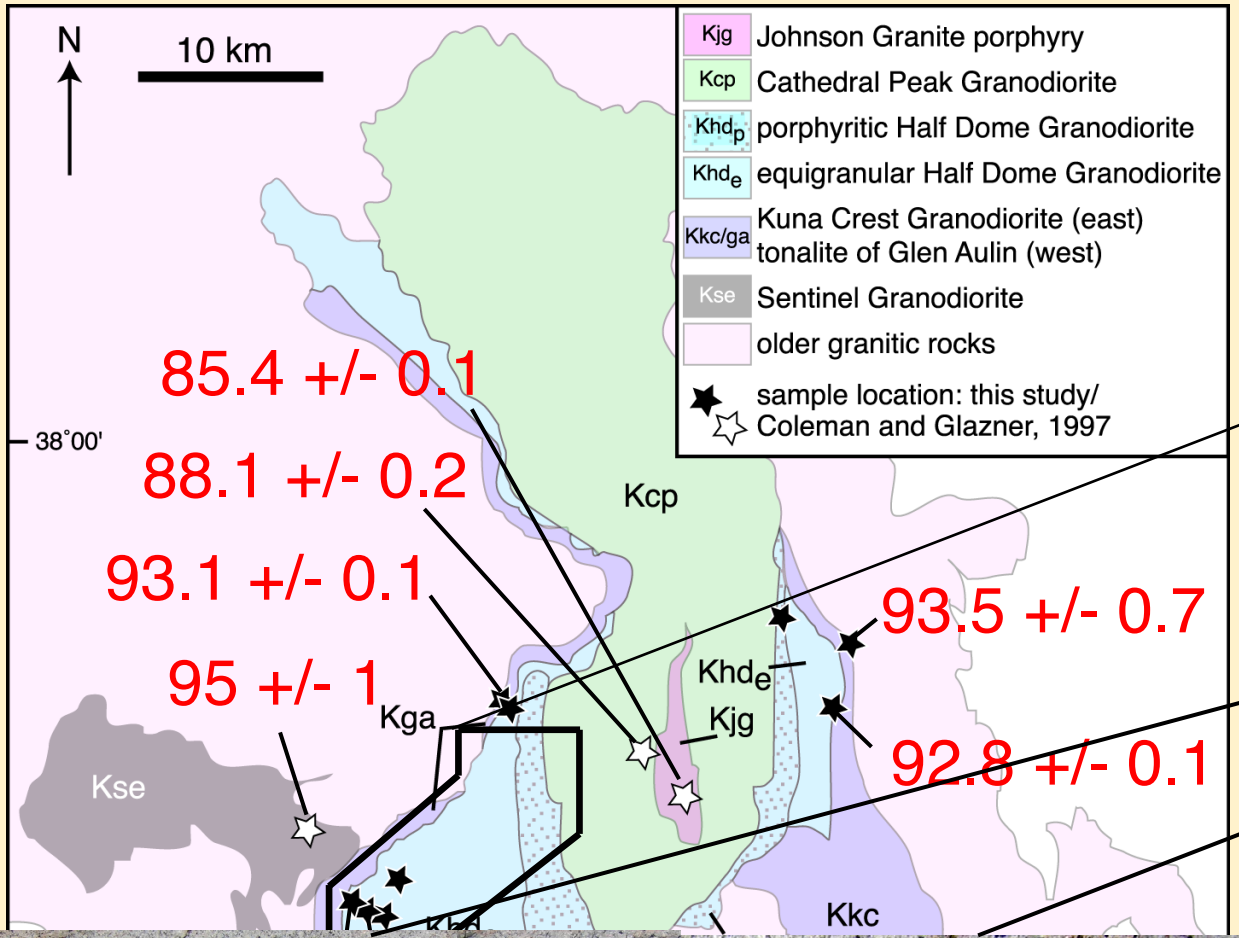
John Bartley, University of Utah
Allen Glazner, University of North Carolina

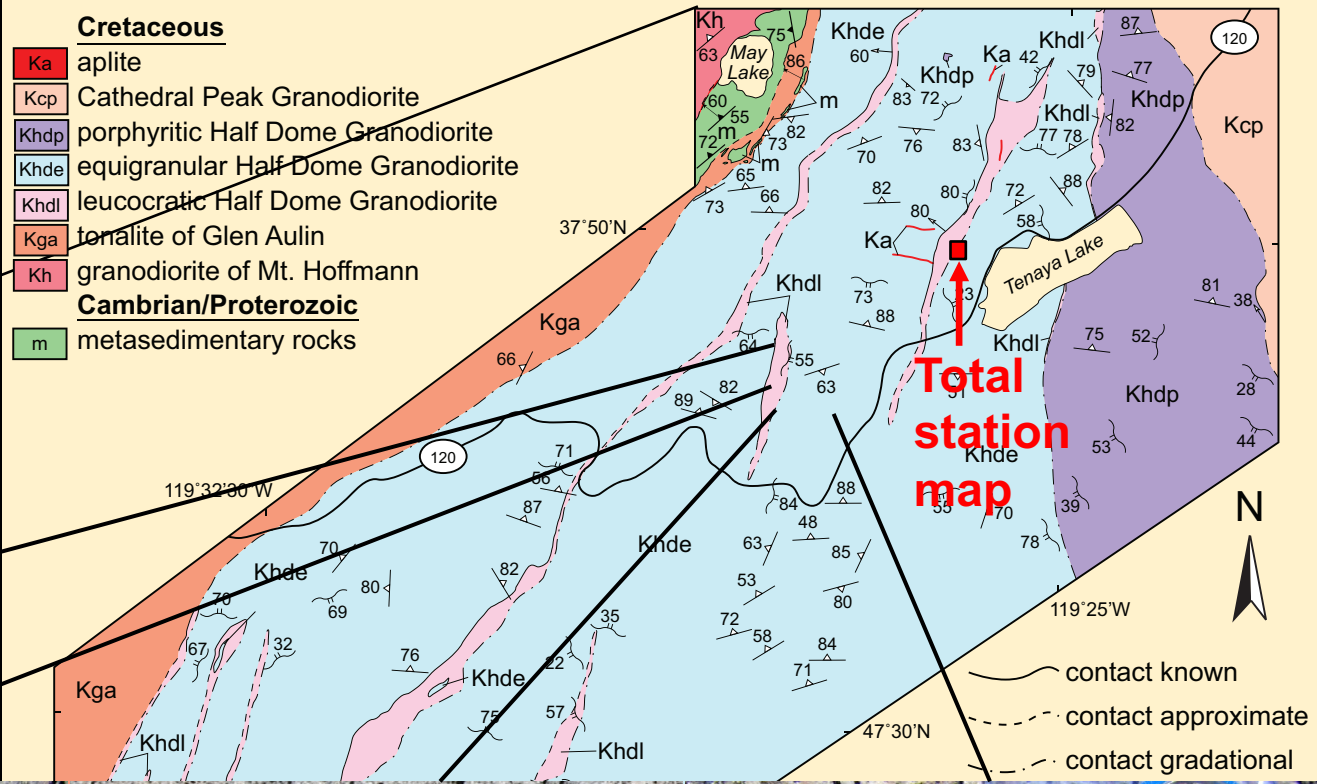


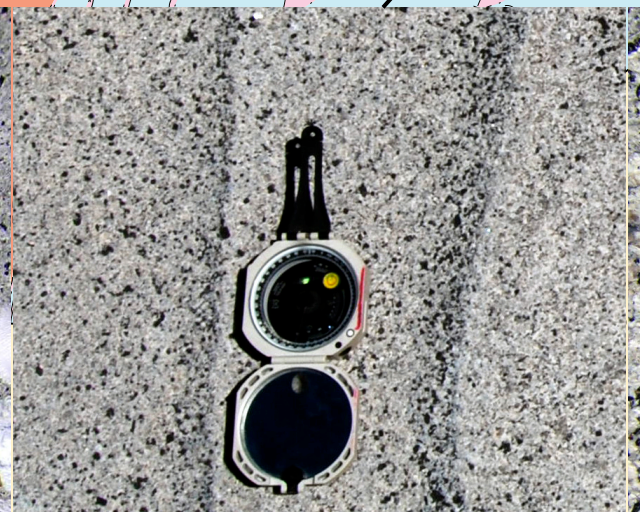
Aplite is a key component during incremental growth of the Tuolumne Intrusive Suite

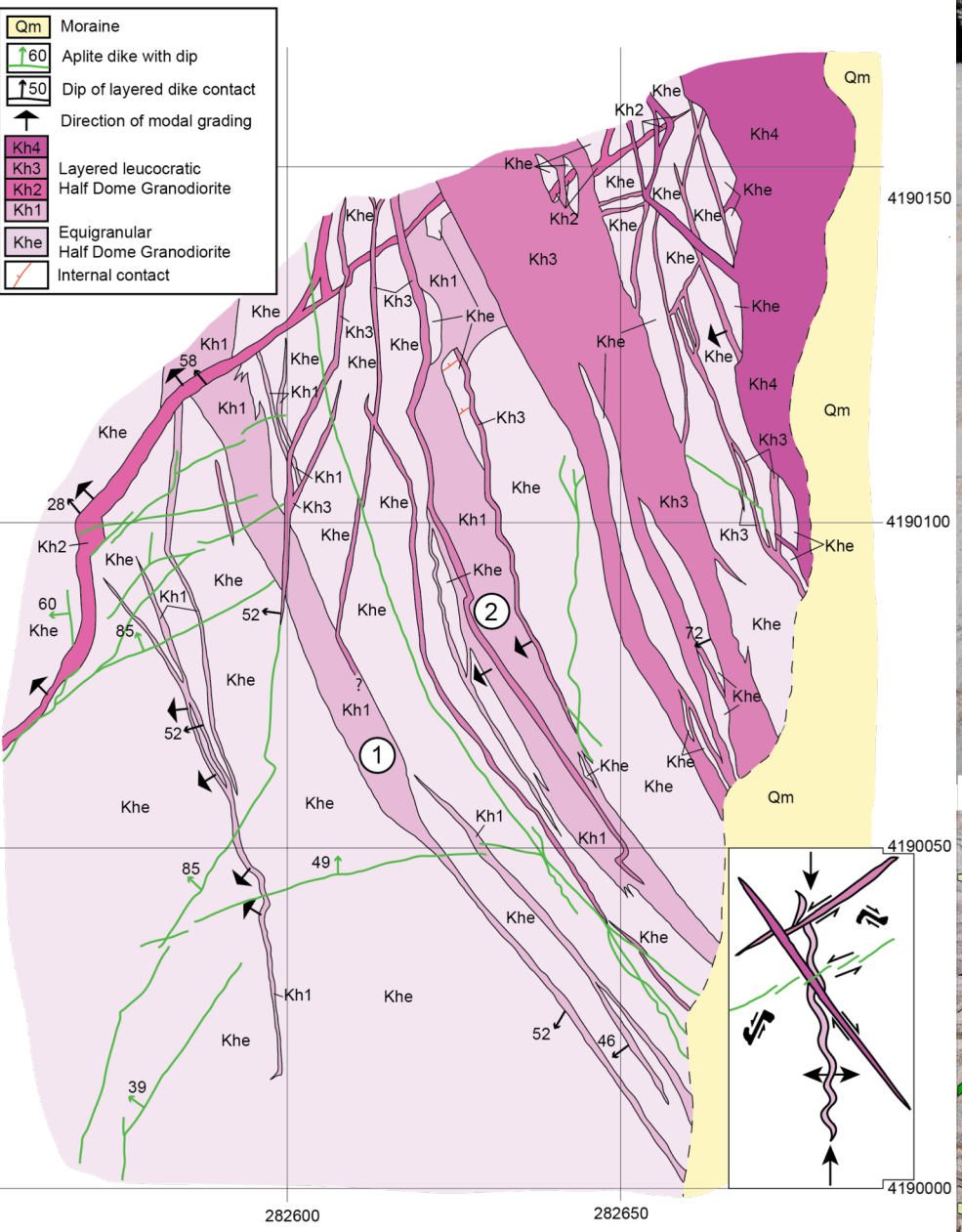
Geologic map of May Lake-Tenaya Canyon area, Yosemite National Park, CA

Coleman et al., 2012







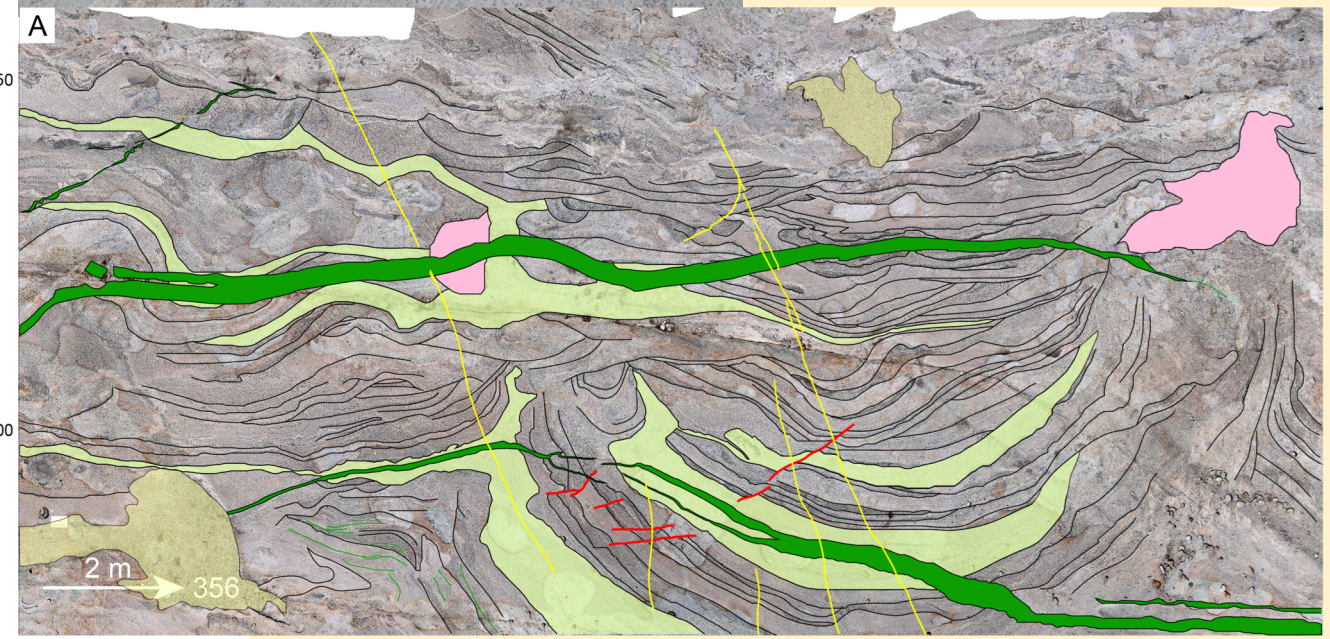


Bartley et al., 2018, Fig. 2A

Transition from 'normal' to leucocratic Half Dome Granodiorite: a plexus of layered dikes

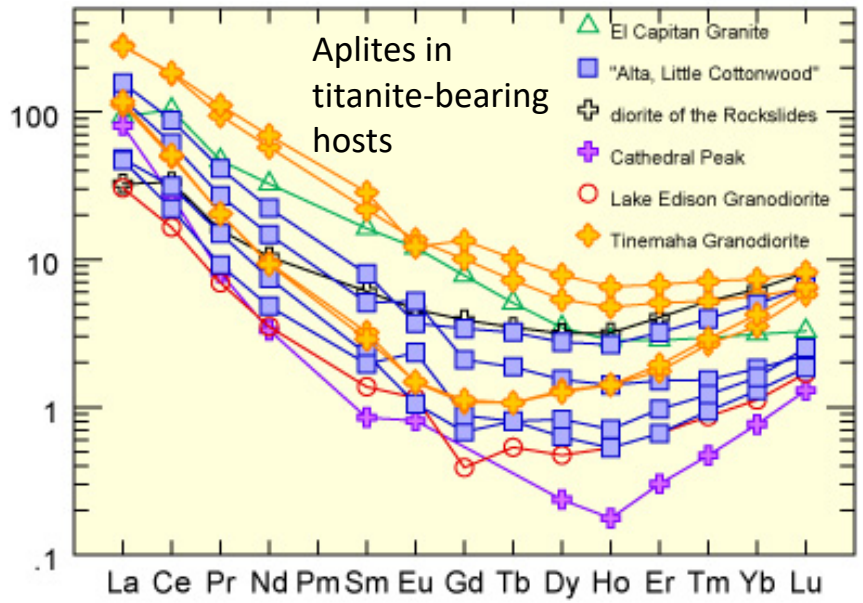
Each mafic-felsic couplet is a separate injection

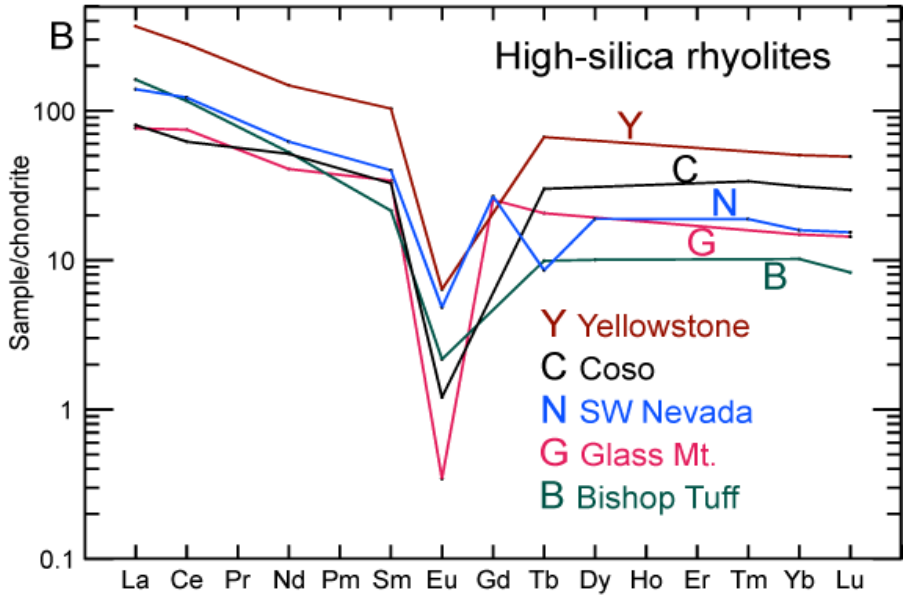
Multiple cross-cutting phases of aplite/leucogranite dikes

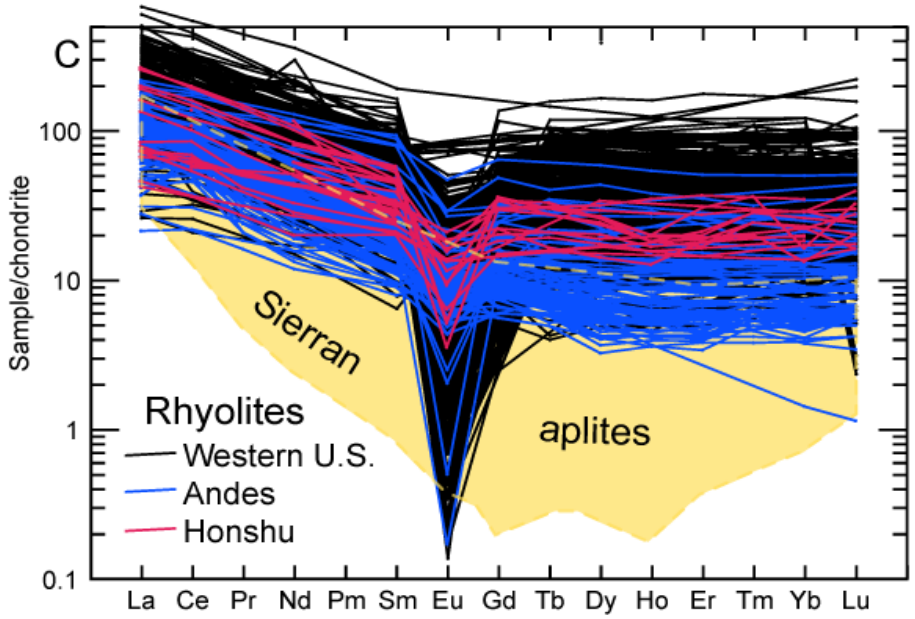


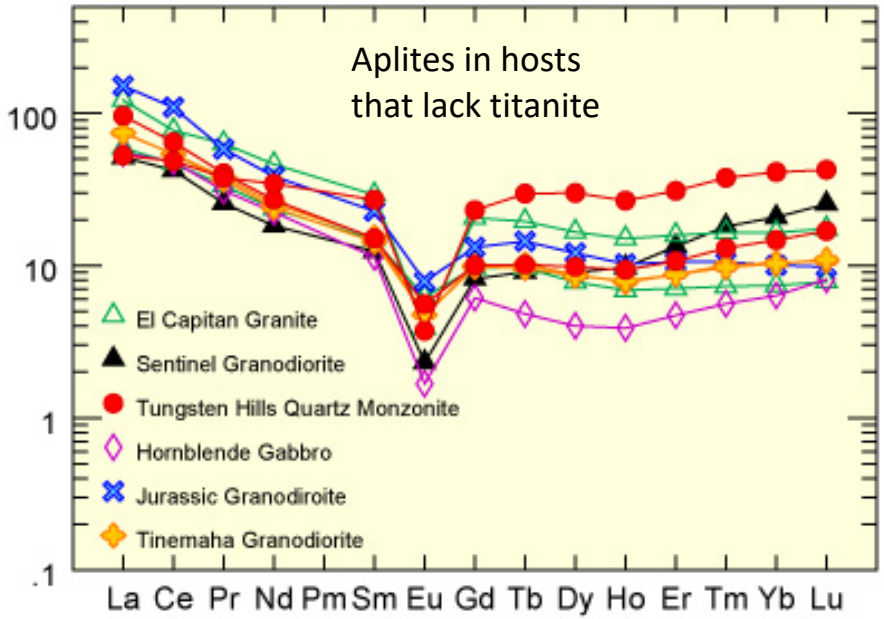
modified from Bartley et al., 2018

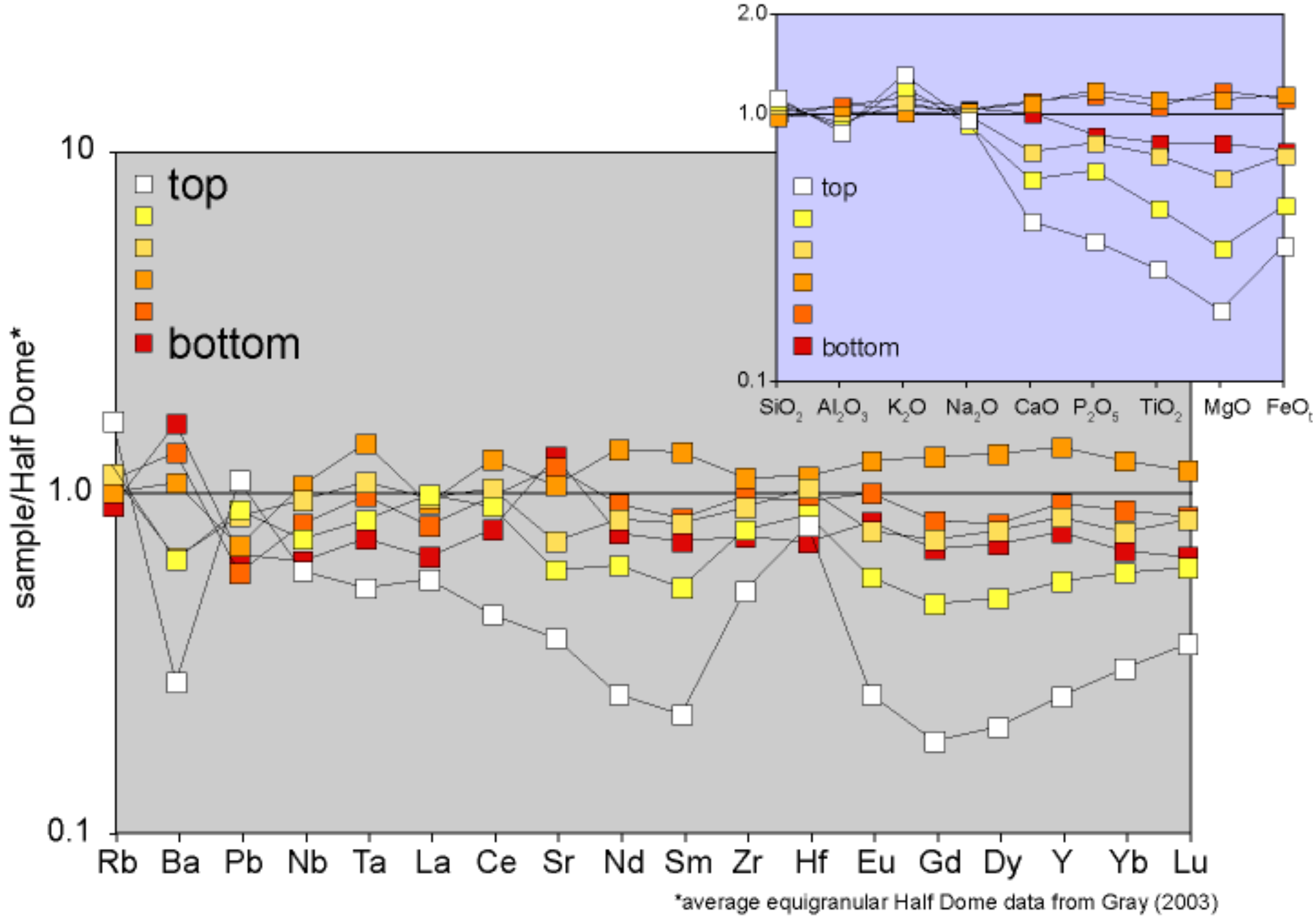
Modified from Glazner et al. (2008) after Stelten et al. (2008)





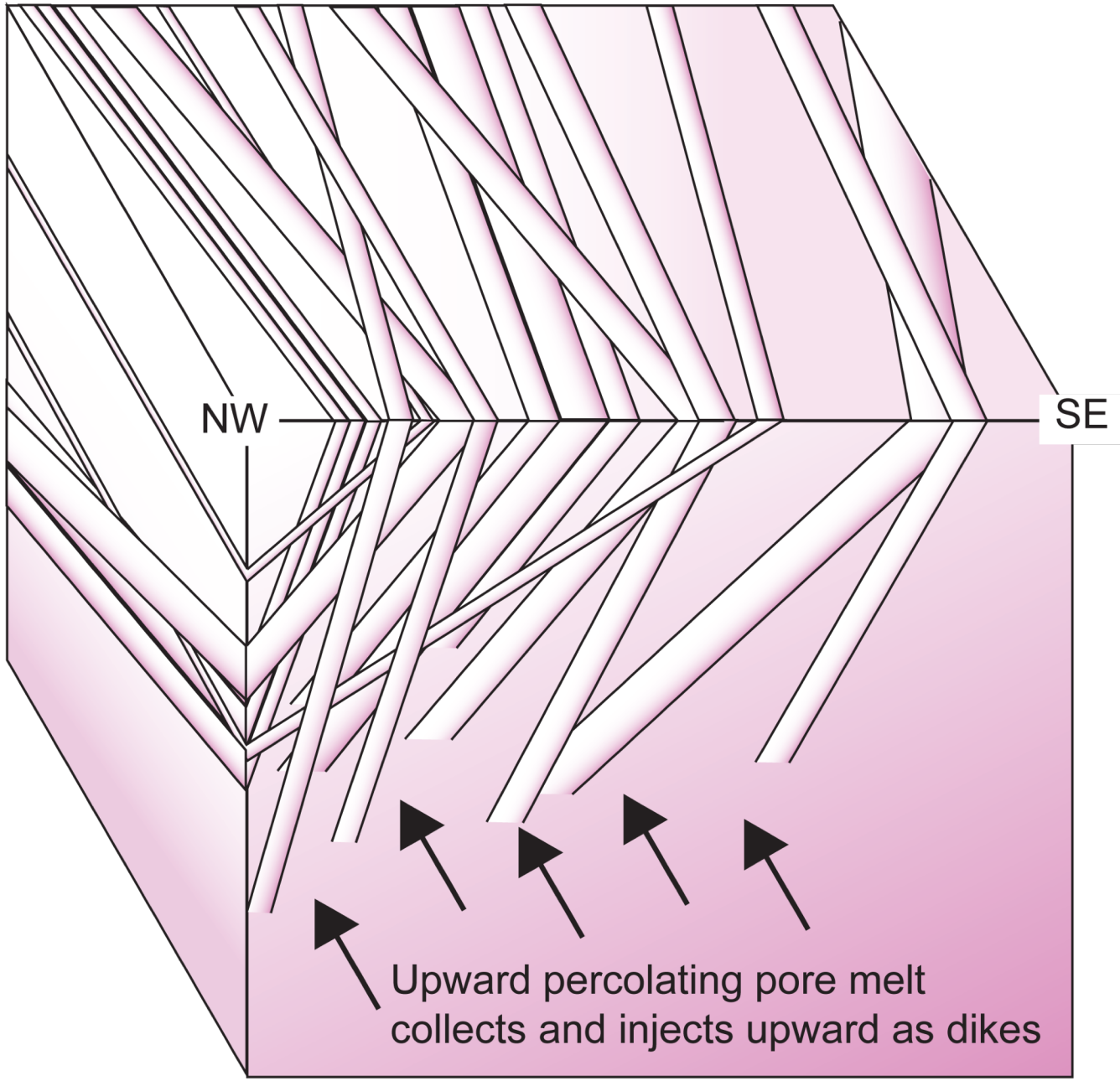






Coleman et al., 2012

Fig. CycleChem

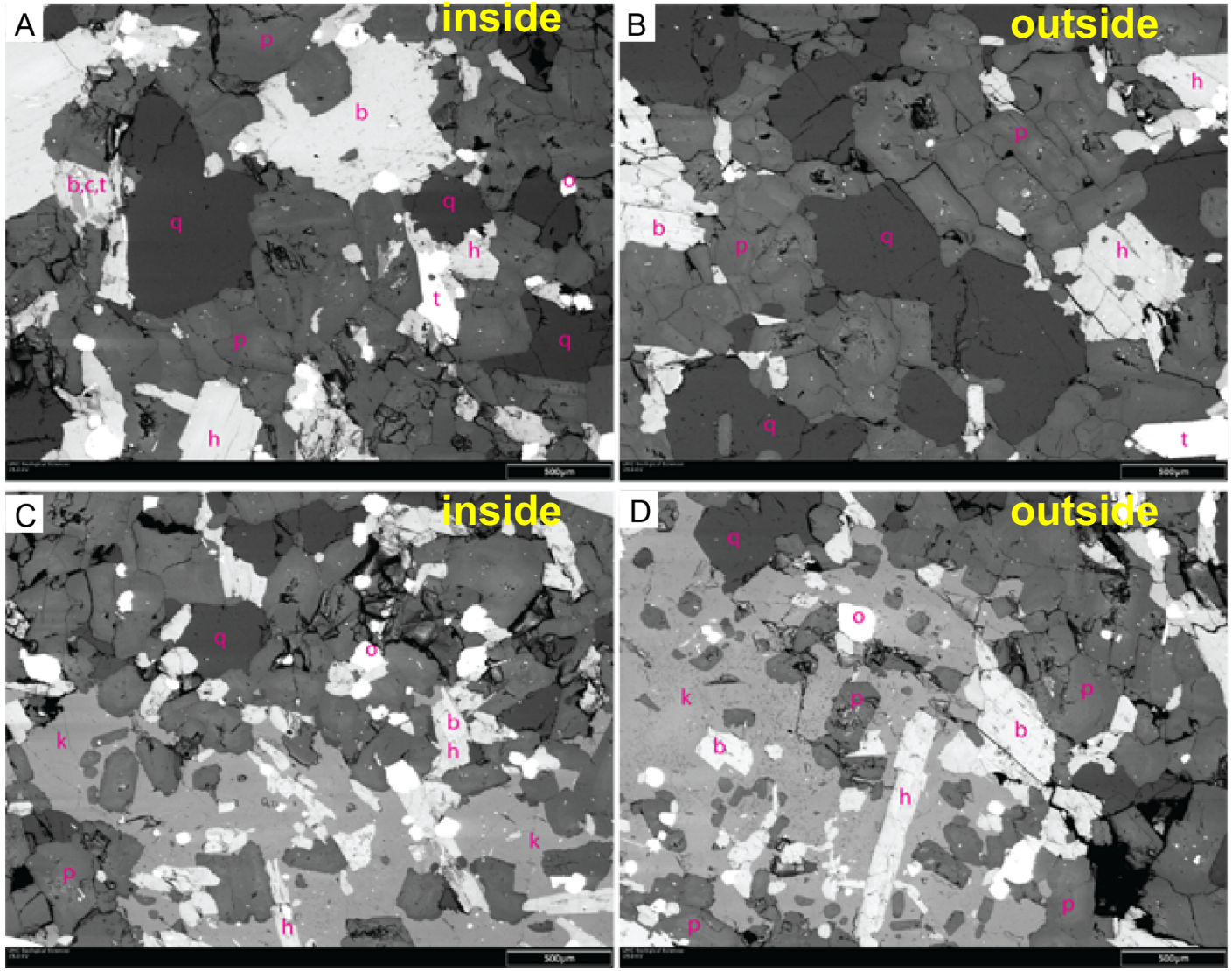


Bartley et al., 2018, Fig. 8


γ ~ 30

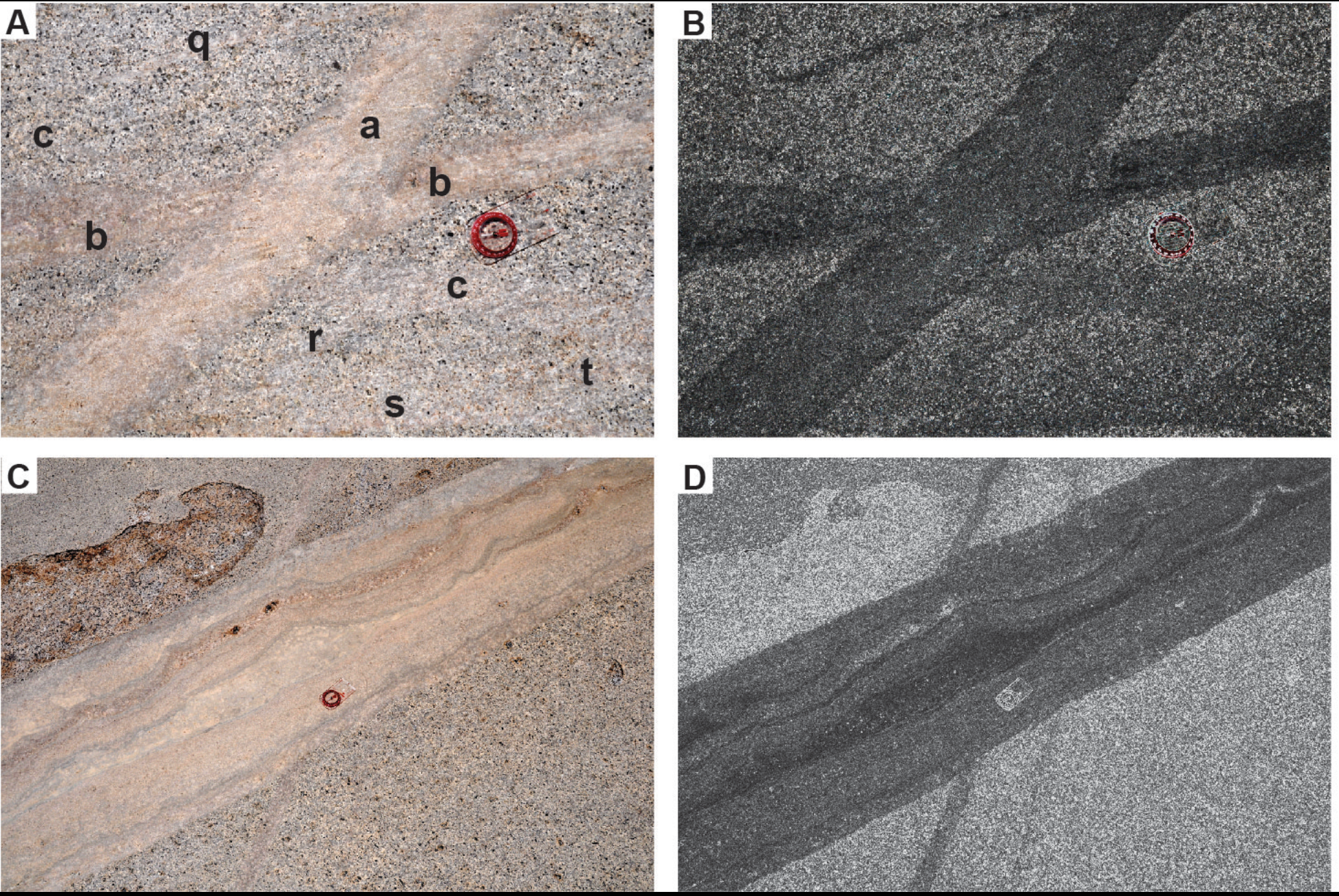
BSE images of Eighth Note samples

Bartley et al., Fig. 7



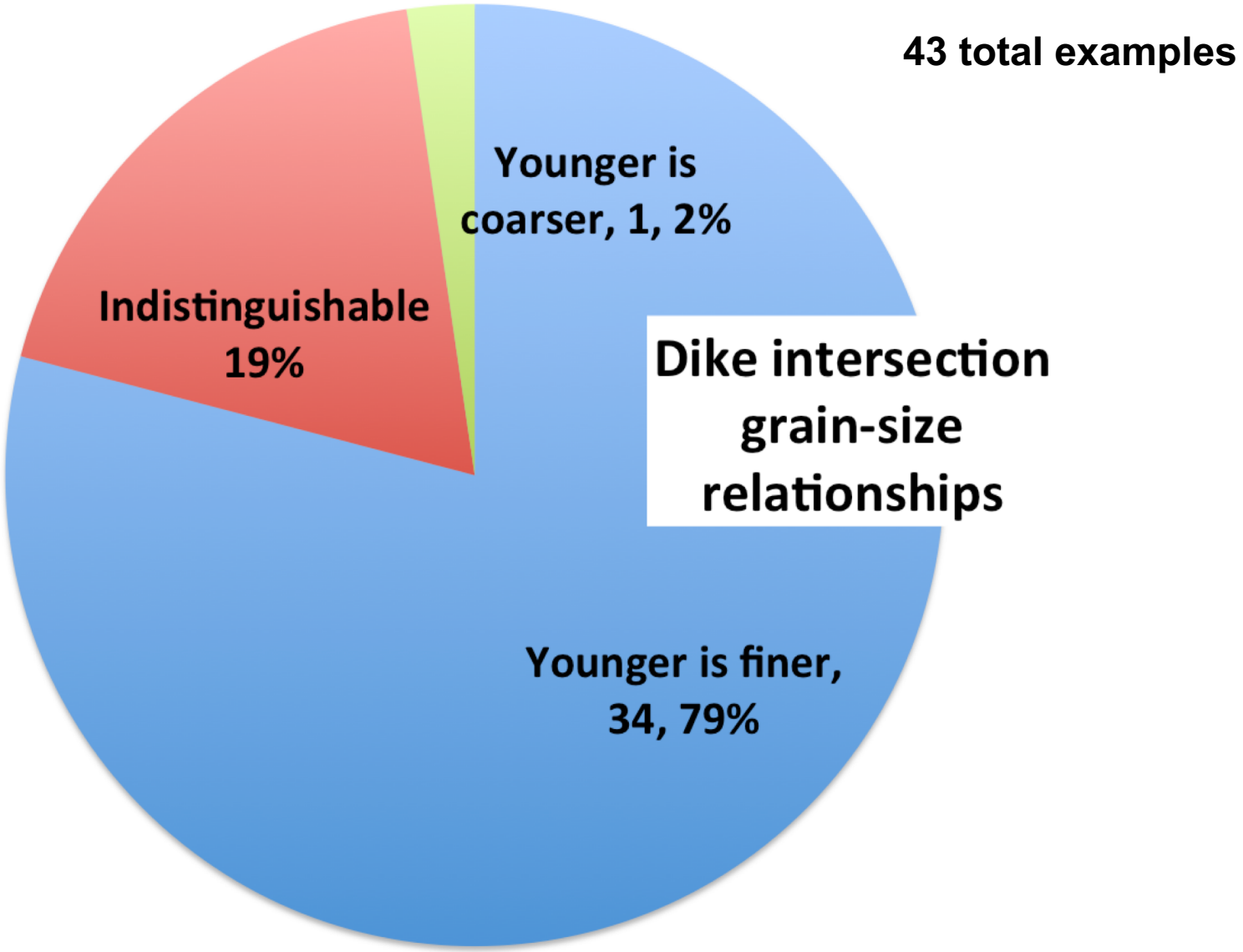
Inside or outside the shear zone—which is which?

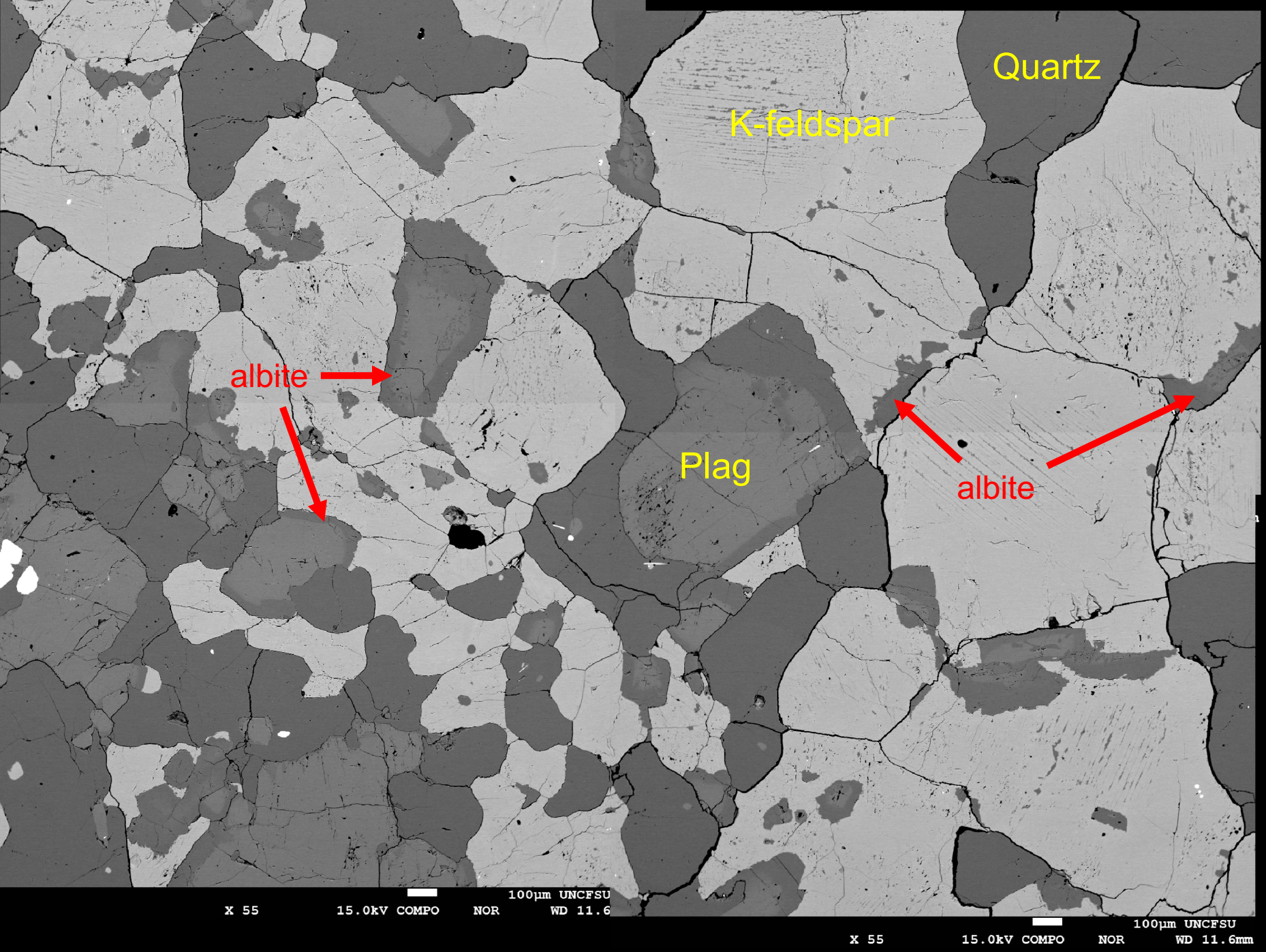
Inference: thorough recrystallization after shearing



Multiple generations of cross-cutting felsic dikes: grain size increases with age

Outcrop observation of cross-cutting dikes indicates that older dikes are coarser-grained than younger



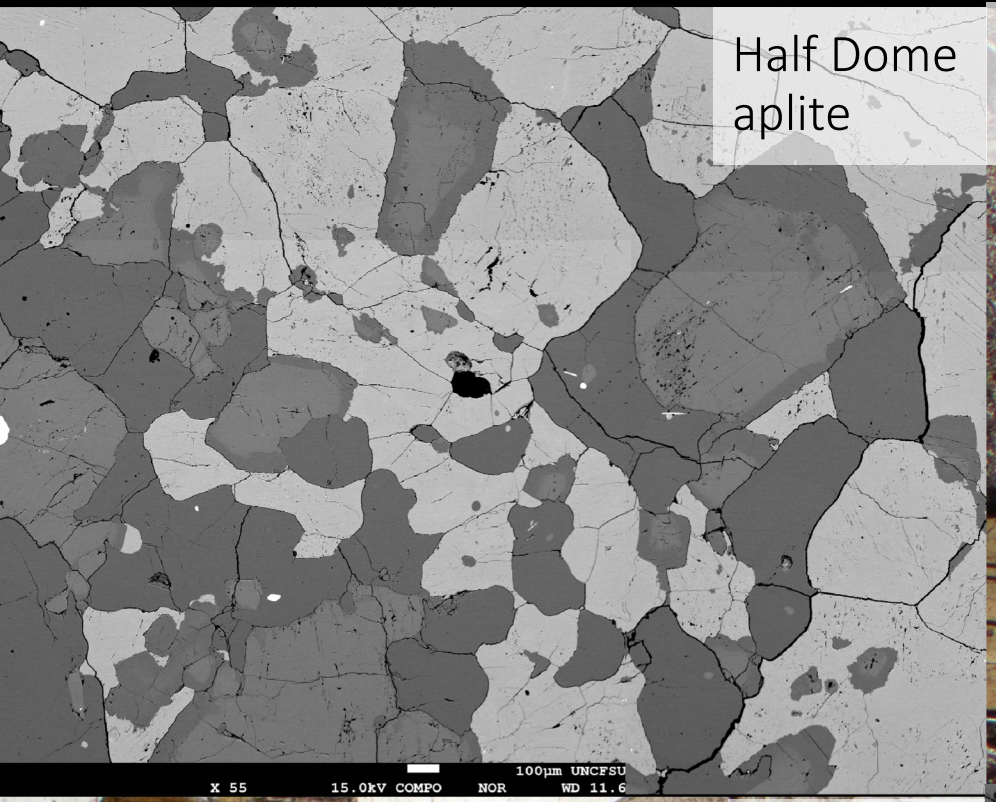


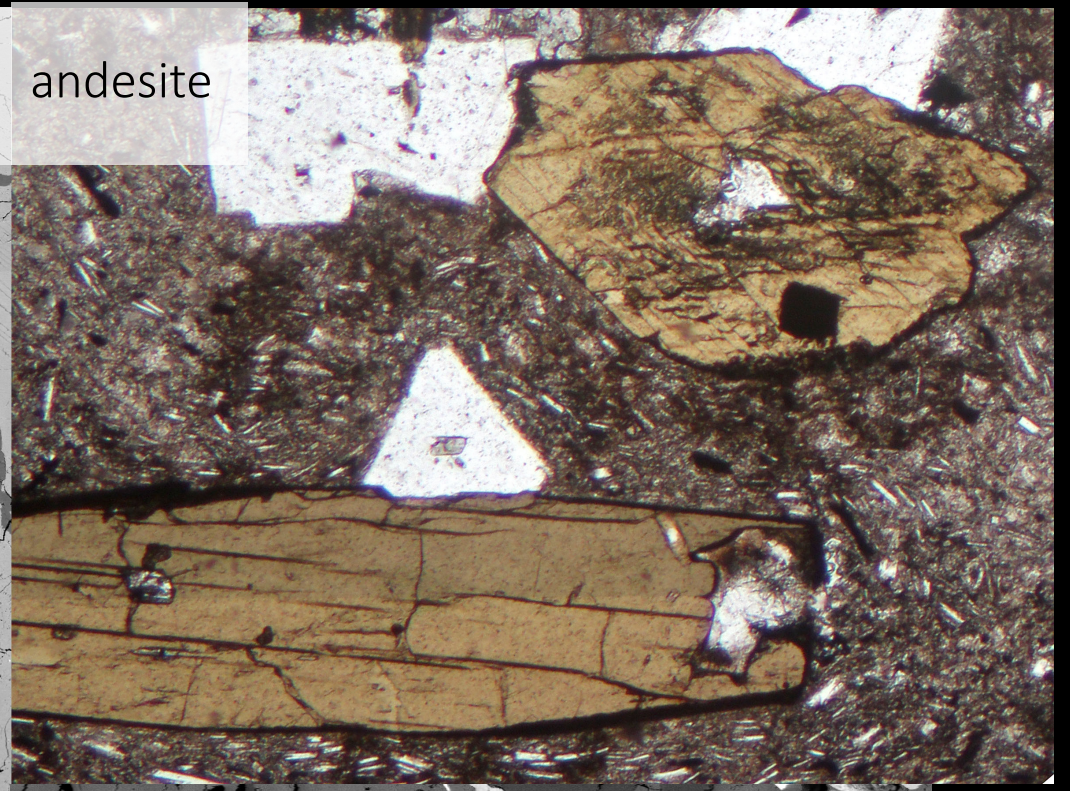
BSE image of Half Dome aplite

Few straight grain boundaries

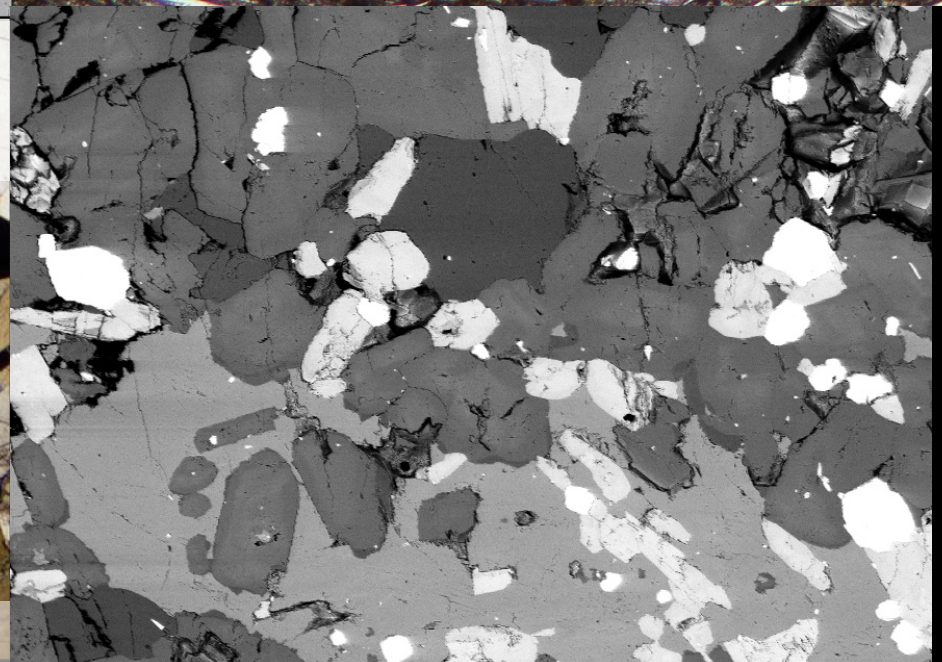
Most smoothly curved; some highly sinuous

Albite between plagioclase and K-spar, partially replaces K-spar along grain boundaries





Half Dome aplite is a metaigneous rock.

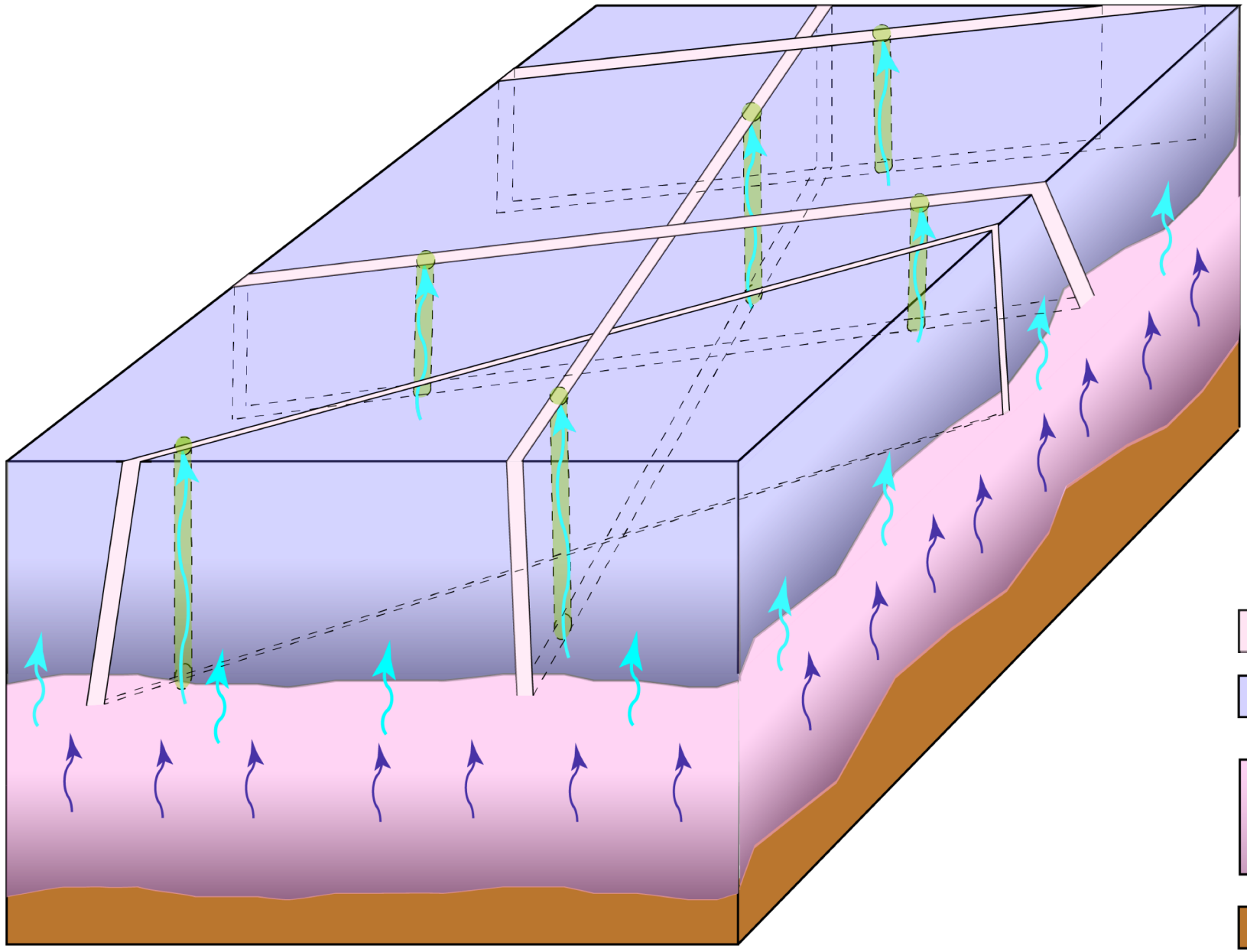


So is the Eighth Note.

Hydrothermal pipes are localized by felsic dikes

Aplite has higher fracture density, probably owing to lower fracture toughness, than host granodiorite

Ascent of aplitic melt and hydrous fluid from crystallizing magma during incremental assembly of Half Dome Granodiorite



hydrothermal pipe

water released by crystallizing magma

aplite

solid granodiorite

Crystallizing magma

leucogranite

(arrow indicates pore melt ascent)

granodiorite

wall rock