

# Correlation between fault fabric strength and creep suggests rock type as a controlling parameter

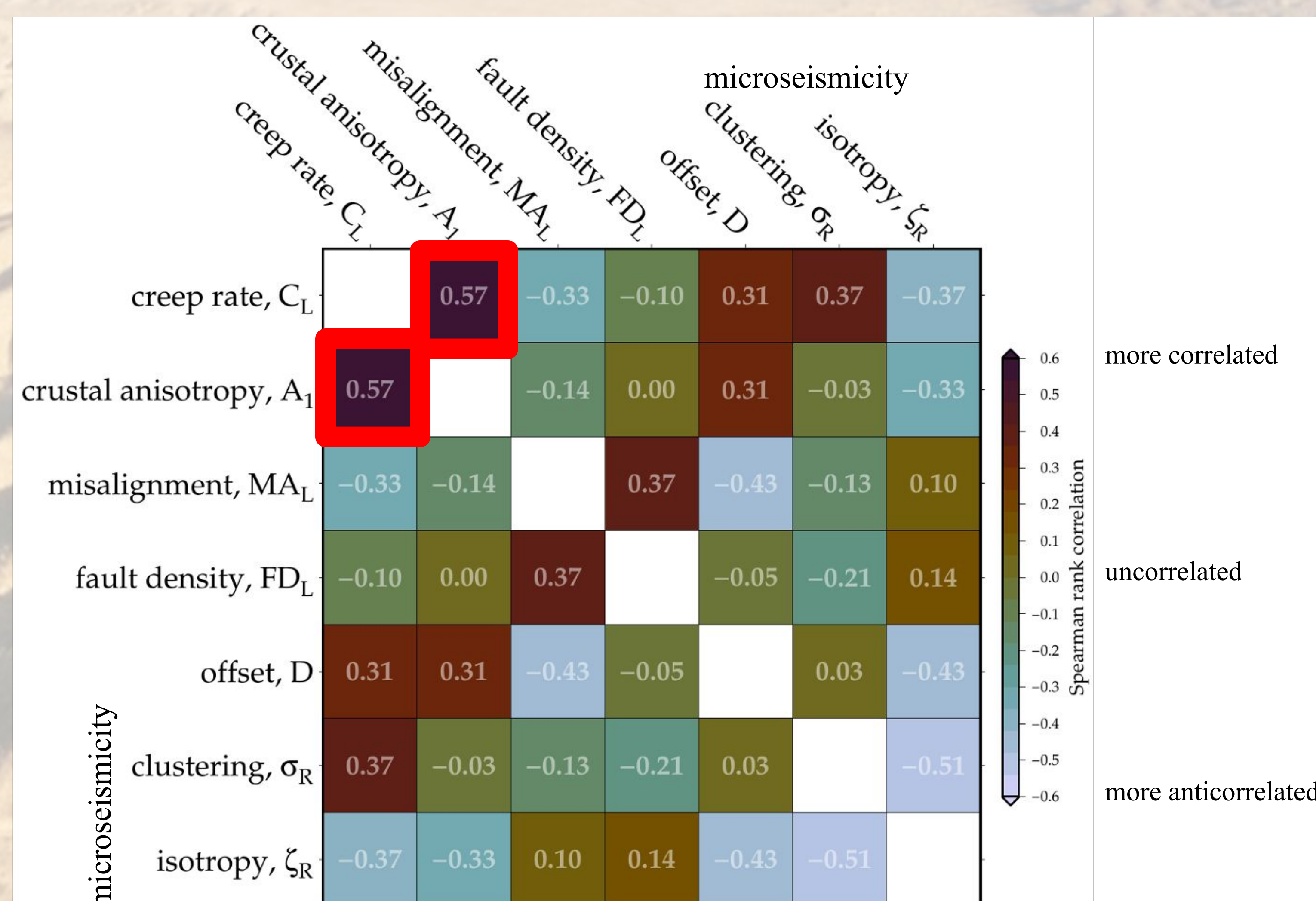
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## Main finding:

The **highest correlation** between **fault parameters** is for **creep versus fault rock fabric strength**



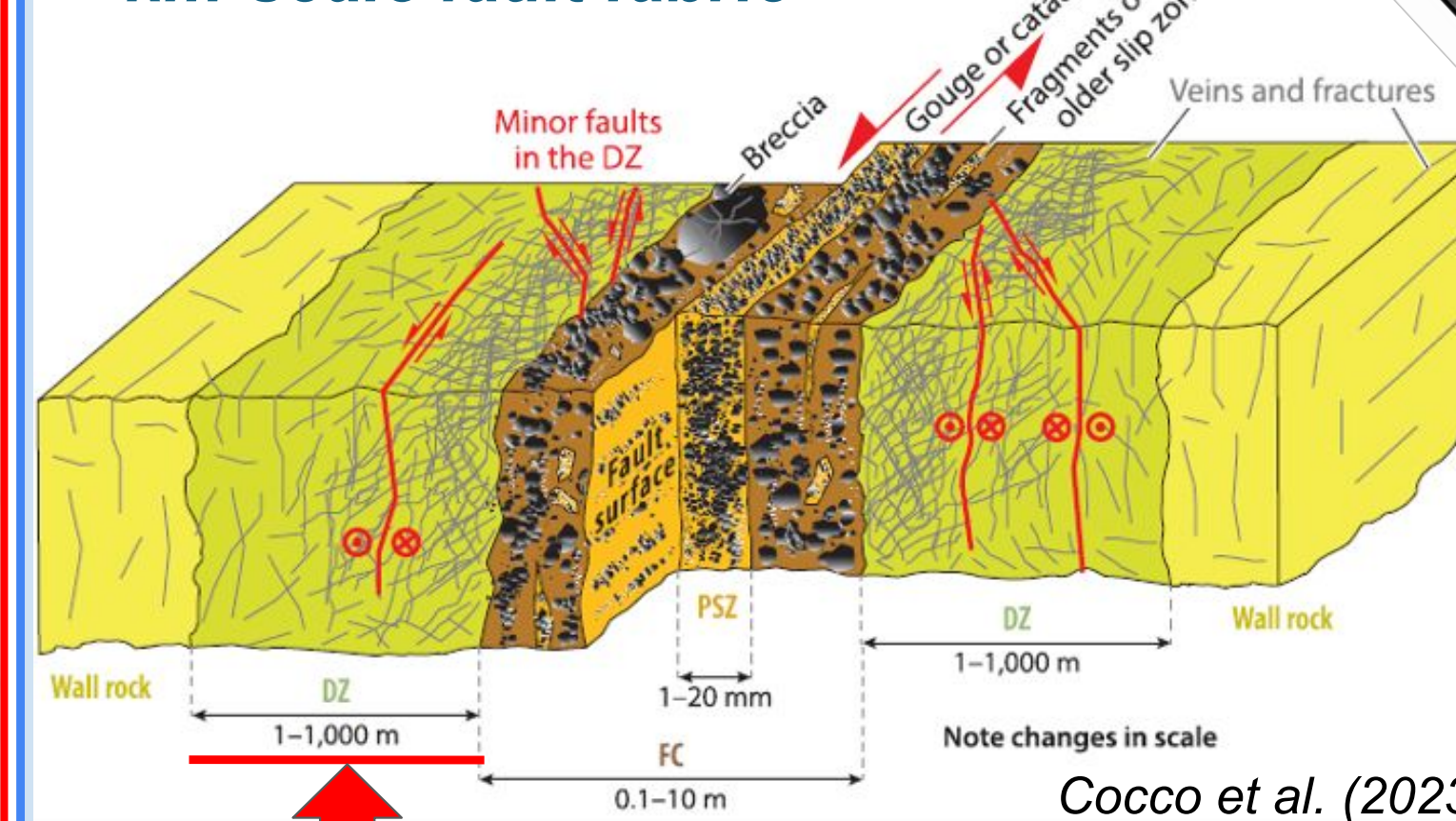
We interpret this as evidence that both **short-term behavior** (creep or locking) as well as **long-term fault deformation** are **controlled by lithology**

Data: Creep rate - Lee et al. 2024's smoothing of Johnson et al. 2022's compilation; crustal anisotropy  $A_1$  - this study; fault misalignment - Lee et al. 2024; fault density - this study; fault offset - compilation, this study; microseismicity clustering and isotropy - Ross et al., 2022

## Study area

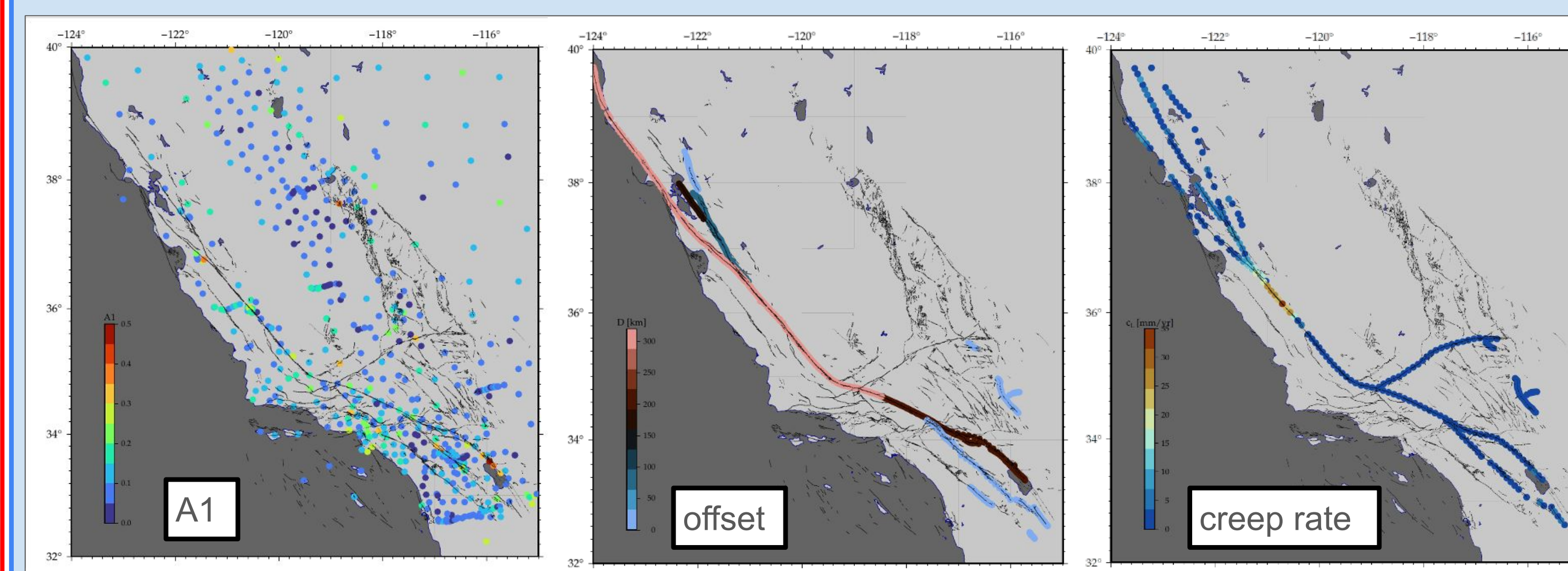
## Target

### km-scale fault fabric



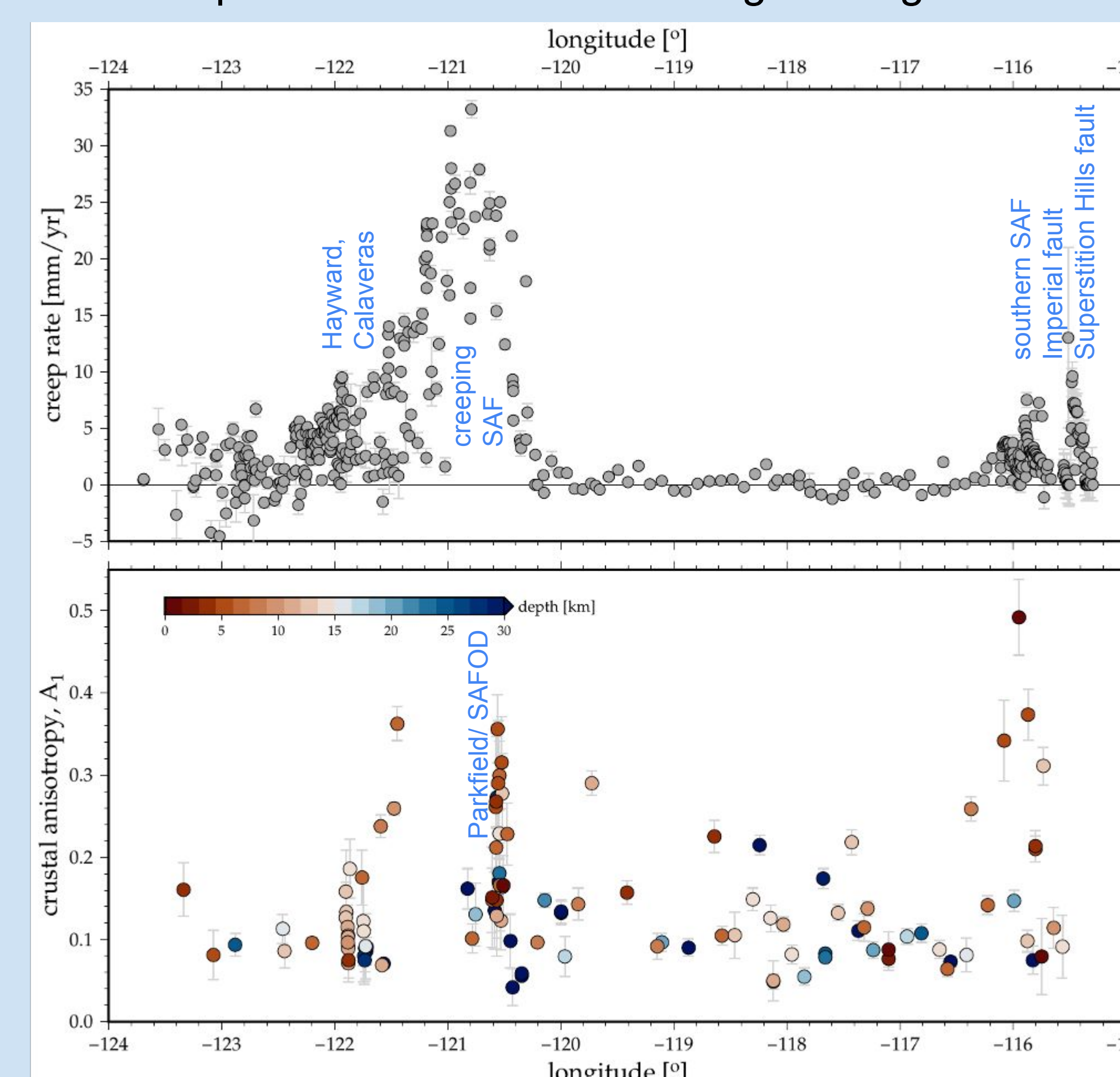
seismic imaging

## Data



Data available for correlations; points within 10 km of fault traces are used. Anisotropy and creep rate are more variable along fault than cumulative offset.

### Creep rate and fault fabric strength along SAF



Main finding figure shows that similar correlations exist throughout study area

Additionally:  $A_1$  has depth resolution, unlike surface creep - example San Jacinto fault zone: No surface creep, but deep creep inferred from other observations; also large  $A_1$

Potential for depth resolution of fault behavior?

## References

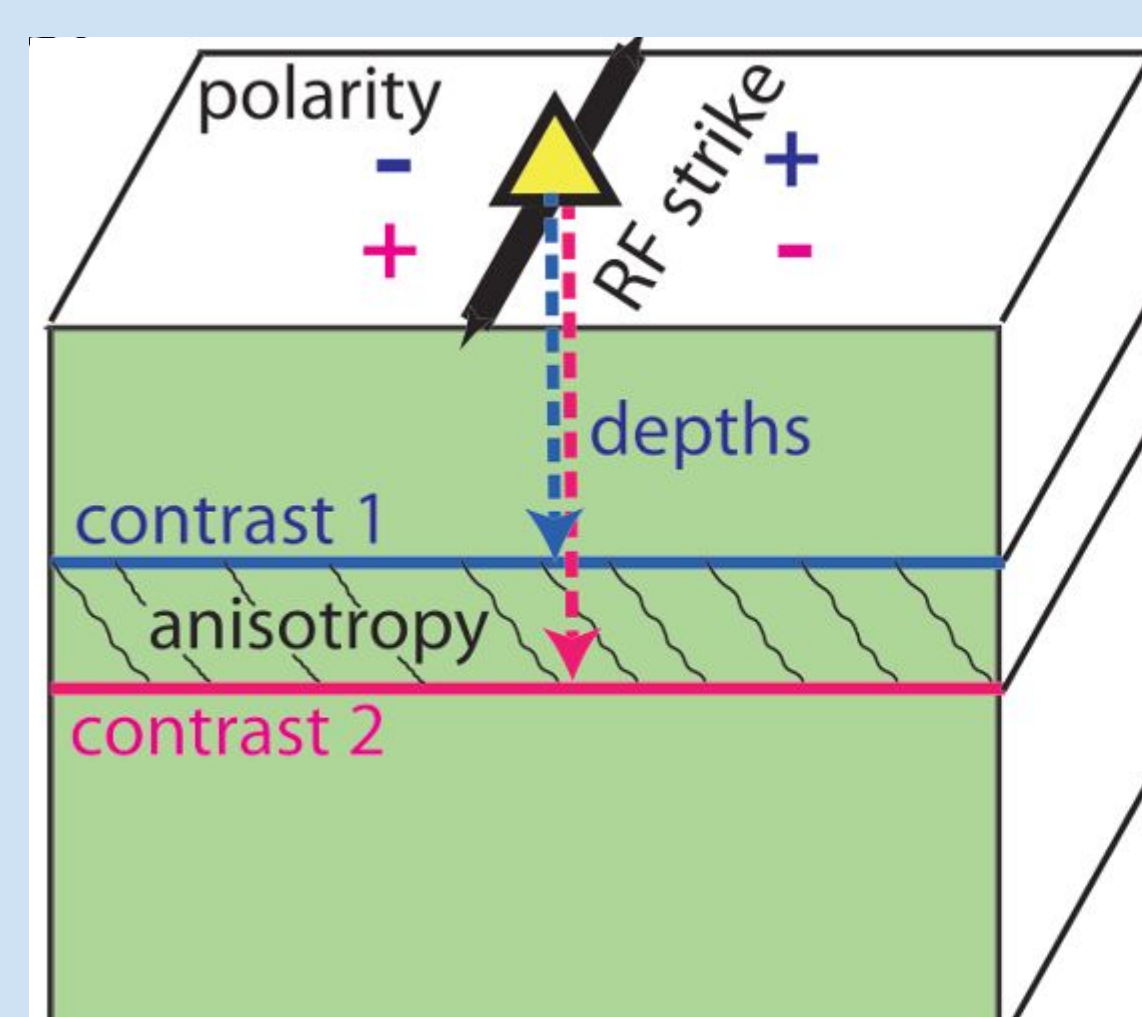
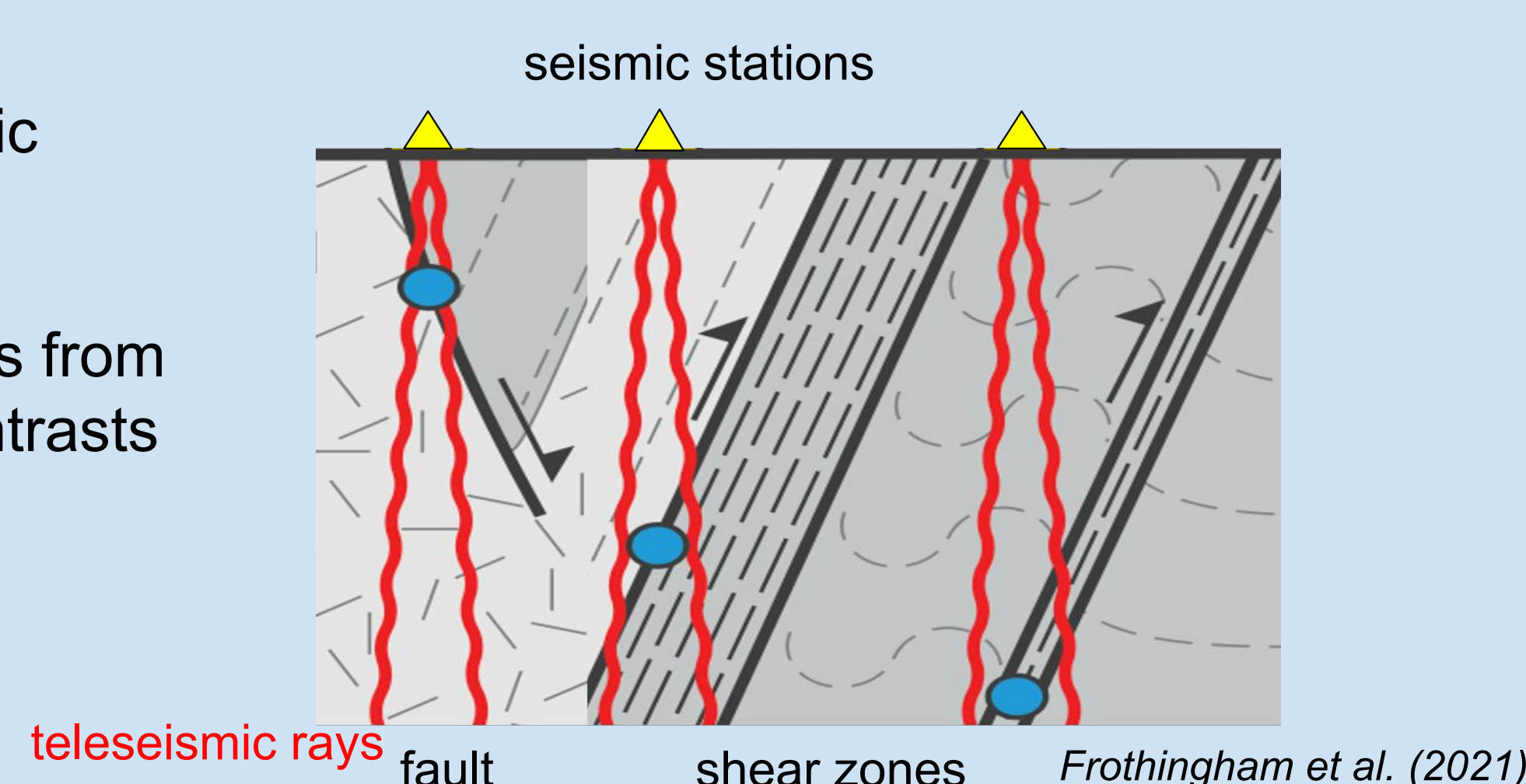
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## Details: Method

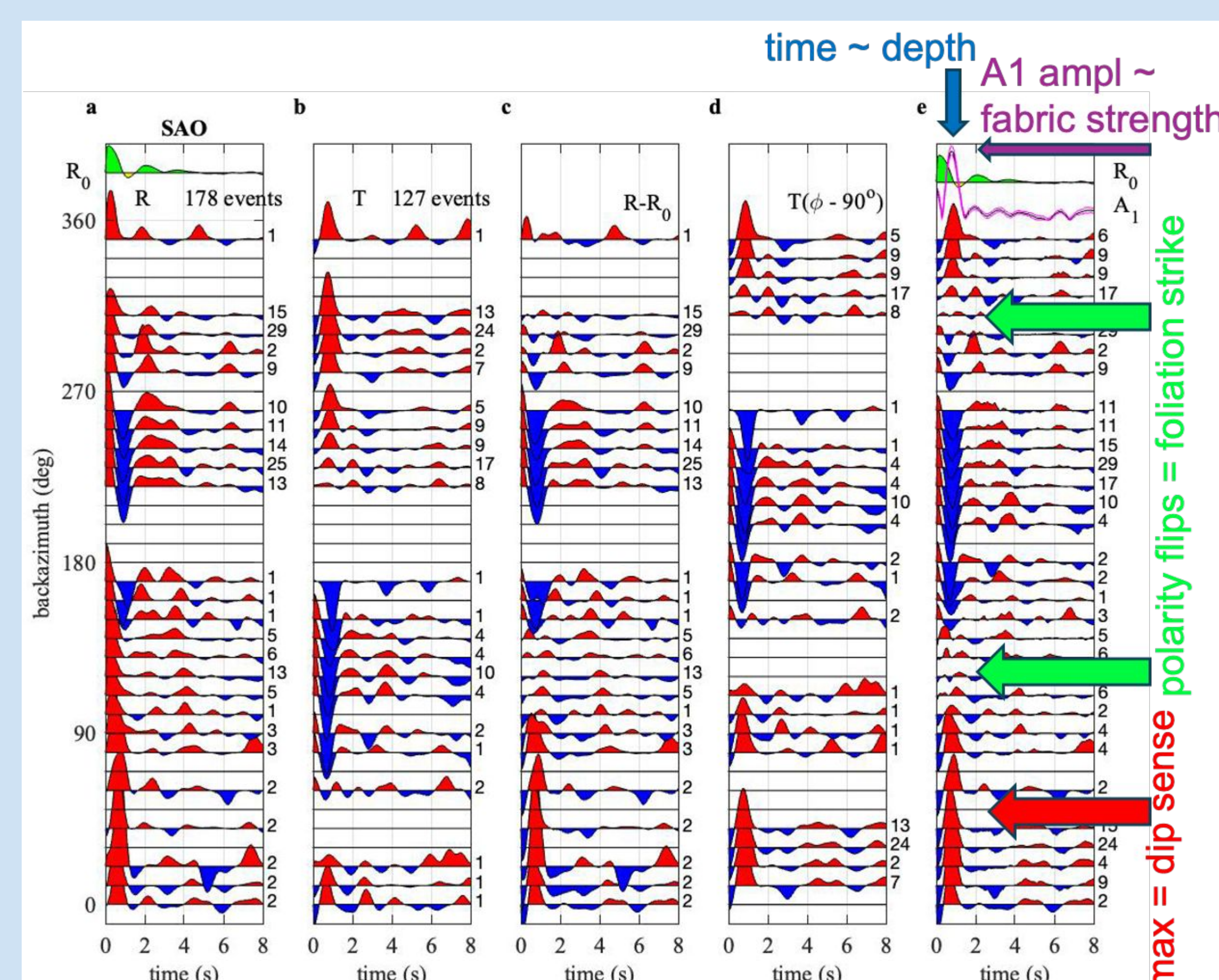
Use teleseismic earthquakes

Ps conversions from anisotropy contrasts

Arrivals vary azimuthally



Cartoon showing relationship between positive amplitude maximum (+) and foliation dip



Station SAO on central San Andreas fault near Calaveras junction; contrast at 6 km depth

Schulte-Pelkum et al. (2020)