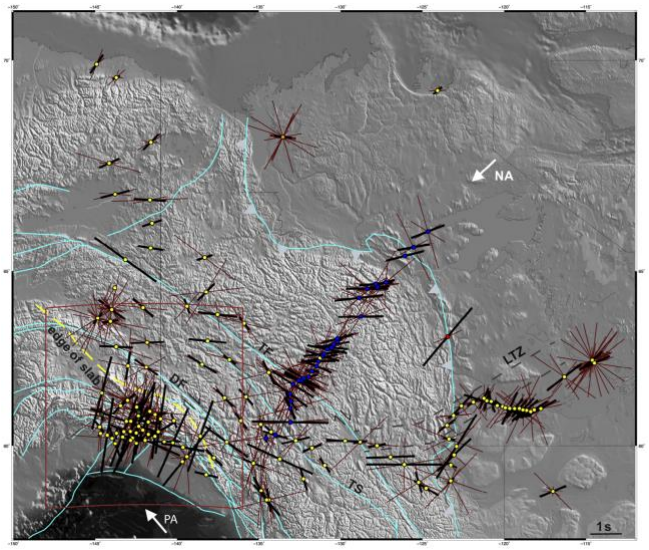
Shear wave splitting in the Mackenzie Mountains and Northern Cordillera

*Derek R Witt[1], **Derek L Schutt**[2], F Jay Breidt[3], Richard C Aster[2], Jeff T Freymueller[4], and Joel F Cubley[5]*



The Mackenzie Mountain range is an actively uplifting fold and thrust belt within the Northern Cordillera region of the Yukon and Northwest Territories, Canada. The range is unusual in that principal shortening is taking place ~500 – 800 km from the plate margin. Initial shear wave splitting results derived from the first year of the Mackenzie Mountain EarthScope Project deployment show a rotation of anisotropic fast axes from NW-SE to NE-SW as one moves to the northeast from the plate margin. Given current estimates of thin lithosphere in the Yukon Territory, the fast anisotropic axis orientations are consistent with a rotation of asthenospheric flow from plate margin parallel near the margin, to absolute plate motion close to the craton. This rotation does not seem to be produced by ongoing subduction in the Gulf of Alaska but is consistent with some of the inferred flow directions of *Finzel et al.* [2014], who suggested that asthenospheric tractions play a key role in Mackenzie Mountain uplift. Consistent with past studies, Coast Ranges regional anisotropy becomes complex, likely reflecting lateral and depth-varying fabric.

(1) Department of Geosciences, Colorado State University, Fort Collins, CO, United States; now at Sustainable Water and Innovative Irrigation Management, Fort Collins, CO, United States; (2) Department of Geosciences, Colorado State University, Fort Collins, CO, United States; (3) Department of Statistics, Colorado State University, Fort Collins, CO, United States; (4) Geophysical Institute, University of Alaska Fairbanks, Fairbanks, AK, United States, (5) Yukon College, Whitehorse, YT, Canada.

References:

Finzel, E.S., Flesch, L.M., and Ridgway, K.D., 2014, Present-day geodynamics of the northern North American Cordillera: Earth and Planetary Science Letters v. 404, p, 111–123.