# Fault Locations and Alaska Tectonics Using Seismicity (FLATS): Science objectives and deployment strategy

Carl Tape, Michael West, Kyle Smith

Geophysical Institute
University of Alaska Fairbanks, USA
EarthScope Annual Meeting, June 2015
Stowe, Vermont

The Minto Flats region of central Alaska contains an 80-km-long, 8-km-deep sedimentary basin and a 180-km-long strike-slip fault system (Figure 1). The most recent notable earthquake on the fault system was a $M_w$ 6.0 in 1995; a $M > 7$ earthquake occurred in 1937 on a similar fault system to the east. Due to lack of roads and bedrock in this region, there has never been a seismometer deployed. The FLATS seismic experiment (2014–2019) contains 13 broadband stations and is a collaborative effort supported by NSF/PASSCAL and the Alaska Earthquake Center. It aims to characterize the structural and kinematic relationships between deep sub-basin crustal faulting and active basin formation and deformation. Stations inside and outside the basin should help to characterize the seismic response for the basin for small and large earthquakes. The project poses several logistical challenges, notably flooding, freeze/thaw, and cold. The Tanana river provides station access via boat, and radio telemetry will facilitate real-time data acquisition.

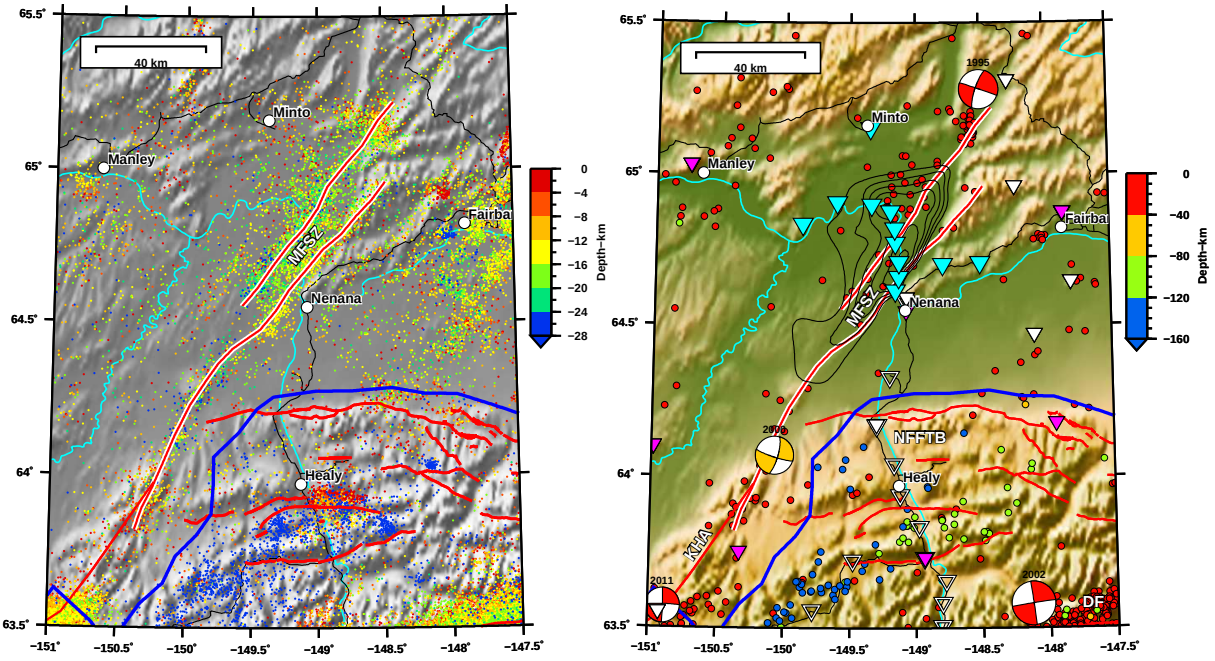


Figure 1: Slab and crustal seismicity in the vicinity of Nenana basin, central Alaska. Blue line marks the lateral extent of deep slab seismicity. **(left)** All seismicity ($M > 0$, 1990–2010) reveals two distinct bands associated with the Minto Flats seismic zone (MFSZ). **(right)** Moderate ($M > 3$) and major earthquakes in the same region as (a), with permanent and proposed broadband stations (solid triangles) and broadband stations from previous deployments (open triangles). The cyan triangles are the planned FLATS stations; the magenta triangles are the TA stations. The gravity-low contours from *Saltus et al.* (2008) reveal the Nenana basin, which has a maximum depth of approximately 8.0 km. Fault labels are for the Denali fault (DF), the Northern Foothill fold-and-thrust belt (NFFTB), and the Kantishna Hills anticline (KTA) (*Koehler et al.*, 2012).

## References

Koehler, R. D., R.-E. Farrell, P. A. C. Burns, and R. A. Combelick (2012), Quaternary faults and folds in Alaska: A digital database, Alaska Div. Geol. Geophys. Surv. Miscellaneous Publication 141, 31 p., 1 sheet, scale 1:3,700,000.

Saltus, R. W., P. J. Brown II, , R. L. Morin, and P. L. Hill (2008), 2006 Compilation of Alaska Gravity Data and Historical Reports, U.S. Geol. Survey Digital Series 264, CD-ROM.