The Superior Province Rifting Earthscope Experiment (SPREE)

S. van der Lee, E. Wolin, K. Tekverk, F. Koch, P. Weitzel, & the SPREE Team

The Superior Province Rifting Earthscope Flexible Array (FA) Experiment (SPREE) has been running for two years with a data return of nearly 97%. The SPREE station footprint includes a Transportable Array (TA) like coverage in Ontario and two pairs of lines with a denser, ~12 km interstation spacing in Minnesota and Wisconsin. This area includes the 1 Ga mid-continent rift system, which is characterized by prominent surface gravity and magnetic anomalies, caused by between 0.5 and 1.5 million km3 of basalt in our study region, flanked by reverse faults and sediment-covered Precambrian crust.

SPREE station noise is typically between the new low and high noise curves. SPREE stations record strong horizontal noise at long periods, and more confined resonance peaks at short periods for some stations. Daily noise is characteristically different from nightly noise. Microseismic noise is expressed in two characteristic peaks, that occasionally morph into a series of three distinct noise peaks. The power of the microseismic noise can be related to oceanic storms.

We will show a number of interesting station noise spectra alongside results from research in progress on SPREE data analysis.

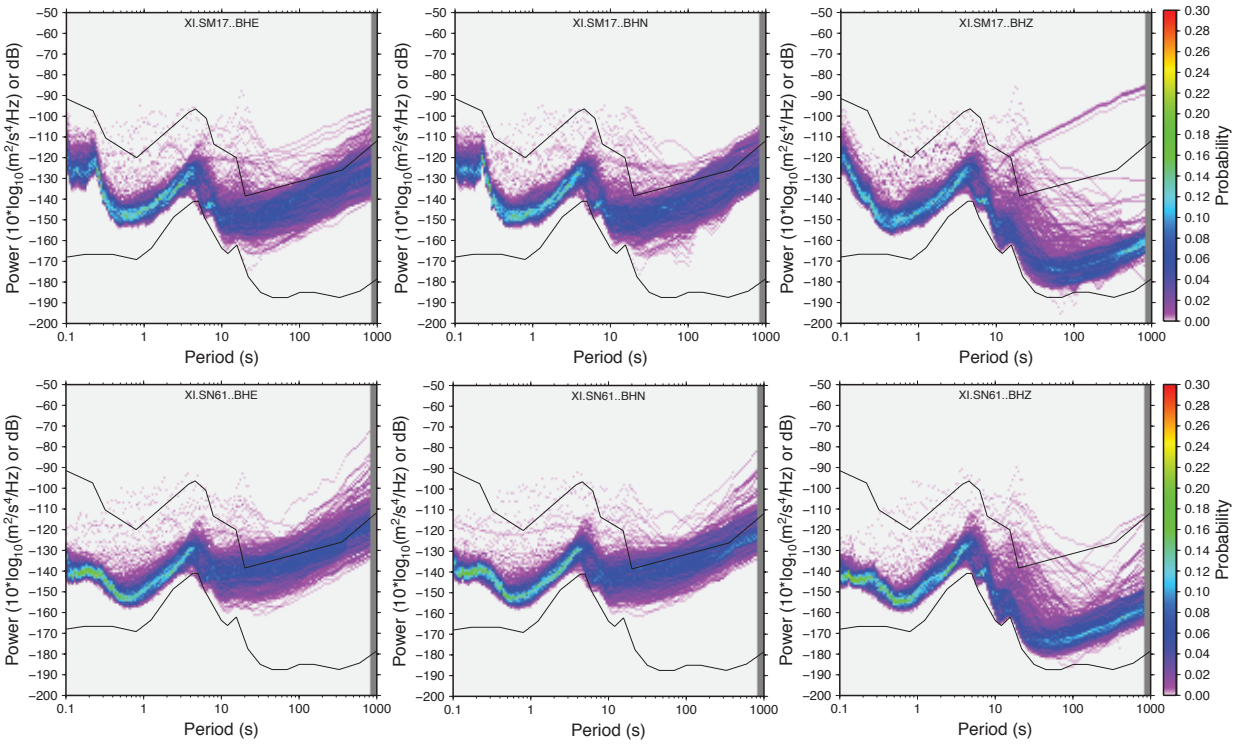

Figure 1. Acceleration signal power as a function of oscillation period, for three components (east, north, and vertical) of two SPREE stations, SM17 and SN61. Both stations are in Wisconsin and show a three-lobed, relatively low-noise microseismic power spectrum between 2 and 20 s, and strong long-period noise on the horizontal components. SM17 shows considerably more high frequency noise with a resonance peak around 4.5 Hz on the horizontal components, which is more sharply defined on the NS component, as well as a steady increase in vertical noise with increasing frequency.