Boise Front Noise Observation (BFNO) report

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1 Description of BFNO

We recorded three-component passive seismic noise data at Fort Boise, Boise, ID, from January 17 to April 15 2018. These data are intended for monitoring time-lapse changes in ground water and subsurface saturation. The Fort Boise area lies at the edge of the Idaho Batholith and the northern extent of the Western Snake River Plain – the Boise Front. In this area there is ongoing geothermal resource extraction by the City of Boise [1].

During this time we recorded the north/east/vertical particle velocities continuously at 48 fixed locations with the Fairfield nodes provided by IRIS and UTEP (Figure 1). The sample rate was 500 Hz. The seismic noise in this area is largely generated by traffic on the roads surrounding the site. During the observation, the daily average temperature ranged from -6.7 to 14.7 ^oC (20 to 58.4 ^oF), and the maximum precipitation reached 1.12 cm (0.4 in, Figure 2). Thus these observations provide opportunities to study ground water throughout a winter-spring melt run-off cycle using ambient seismic noise.

2 Details about BFNO and other geophysical measurements

We recorded the GPS information for the 48 locations and processed the GPS records with differential corrections for accurate latitudes and longitudes. We have submitted this location information to the IRIS website [3].

We did an active-source experiment in the field with a weight drop as the source. During the experiment, we increased the sample ratio in the 48 nodes to 1000 Hz. We moved and activated the source during the experiment. The active source locations are shown in Figure 1. We also did electrical resistivity tomography after the BFNO passive seismic observation ended (Figure 1).

References

[1] K E Anderson, J E Kelly, and W L Burnham. Capitol Mall geothermal well No.2: consultant report prepared for CH2M/Hill Central, Boise, Idaho. *Idaho Geothermal Resources - Consultant Reports*, 1981.

[2] Weather Underground. Boise, ID Weather History.

[3] IRIS. Network Summary.

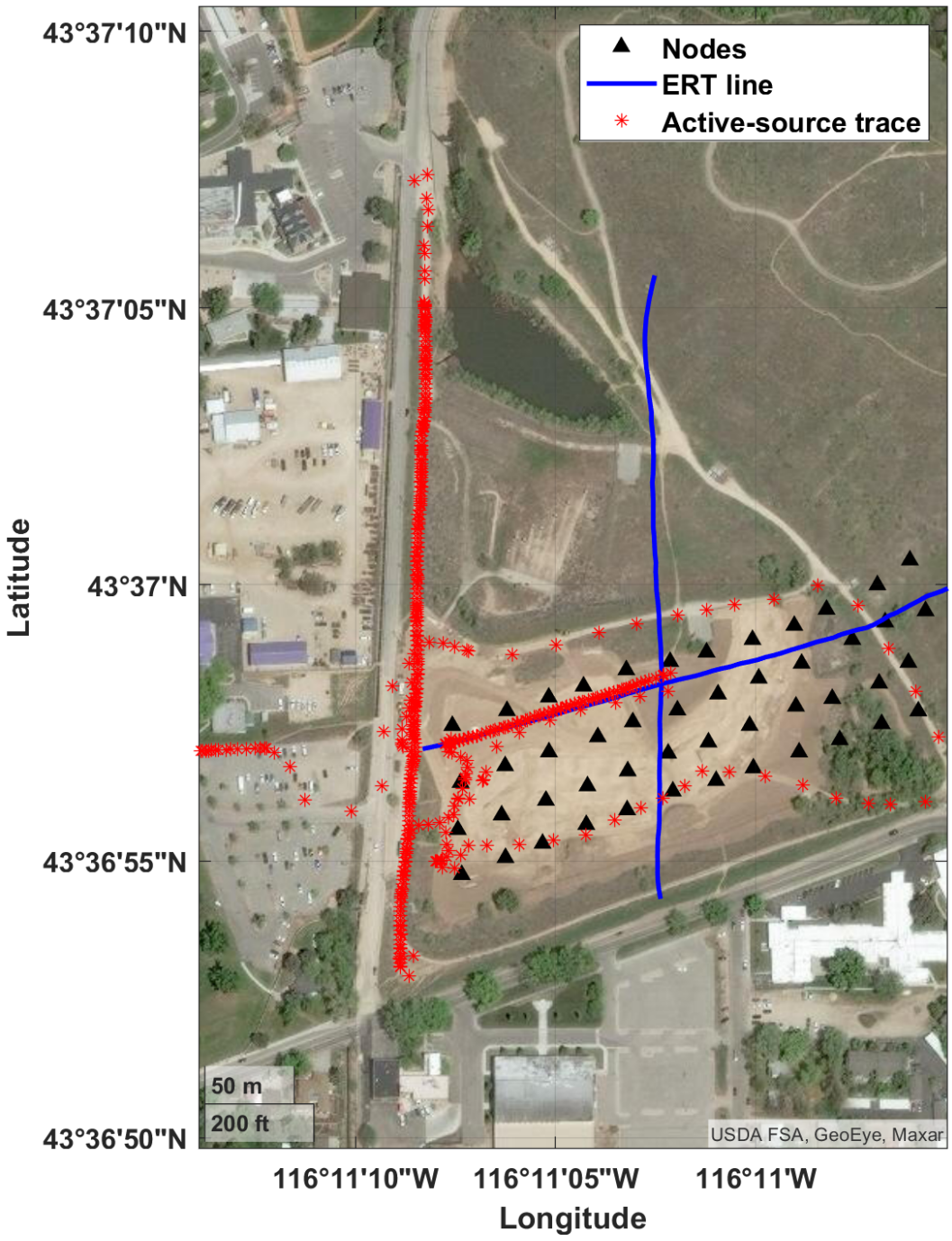

Figure 1: A map of the BFNO experiment site. The 48 observation points are represented by black triangles. We also did an active source experiment on March 27, 2018, and two electrical resistivity tomography (ERT) lines (blue lines) on May 4th, 2018. The red asterisks indicate the locations of the active source shots (a trailer-mounted accelerated weight drop).

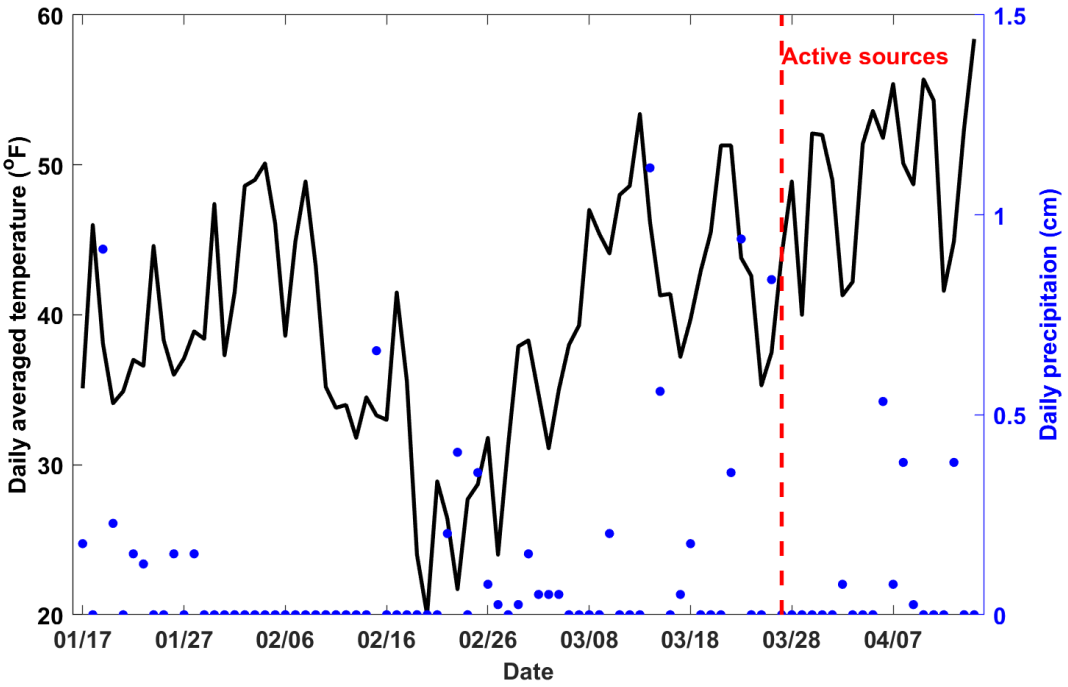

Figure 2: The daily average temperature and precipitation from January 17 to April 15, 2018. The red dash line indicates the date of the active-source experiment, March 27. The temperature and precipitation data are from Weather Underground [2].