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SEISMIC MONITORING OF MASS WASTING EVENTS FOLLOWING THE 2017 BRIAN HEAD WILDFIRE IN SOUTHERN UTAH

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During the 2017 Brian Head wildfire in southern Utah, over 63,000 acres of steep terrain was burned, leaving hydrophobic soil and an increased probability of mass wasting, especially during the annual monsoon season of July through September. Following the fire, we began a two-year experiment with the goal of capturing the seismic signature of debris flows and related events. Between 12 August 2017 and 7 October 2017, we deployed ten 3-component, short-period (Sercel L-28) seismometers in a quasi-linear array about 10 km long. The instruments were provided by IRIS/PASSCAL (with the network code ZV) and recorded continuous ground motion at 250 Hz. We applied frequency-dependent polarization analysis to the continuous data and observed a strong diurnal pattern across a wide frequency range as well as some weather-related transient signals, possibly related to thunder; however, we did not record any signals unambiguously related to mass wasting. We returned to the Brian Head region the following year and between 31 July 2018 and 7 October 2018 we deployed 28, 5-Hz, 3-component Nodal instruments recording continuous ground motion at 500 Hz. We installed a linear, 20-node array with ~275 m spacing along a creek that flowed consistently throughout the experiment and at increased rates during and after rainfall. The remaining eight Nodals followed separate drainages towards a NW-SE running ridge at a gradient of ~30 degrees. Three trail-cameras were also deployed in hopes of having time-stamped evidence of any mass wasting events. We processed the 2018 seismic data with frequency-dependent polarization code and correlated the output with meteorological data from a nearby NOAA station. We tentatively identified ~12 signals related to mass wasting events and are currently characterizing their duration and intensity.