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## Combining Distributed Acoustic Sensing and Beamforming in a Volcanic Environment on Mount Meager, British Columbia.

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We present one of the first applications of Distributed Acoustic Sensing (DAS) in a volcanic environment. The goals are twofold: First, we want to examine the feasibility of DAS in such a remote and extreme environment, and second, we search for active volcanic signals of Mount Meager in British Columbia (Canada).

The Mount Meager massif is an active volcanic complex that is estimated to have the largest geothermal potential in Canada and caused its largest recorded landslide in 2010. We installed a 3-km long fibre-optic cable at 2000 m elevation that crosses the ridge of Mount Meager and traverses the uppermost part of a glacier, yielding continuous measurements from 19 September to 17 October 2019.

We identify ~30 low-frequency (0.01-1 Hz) and 3000 high-frequency (5-45 Hz) events. The low-frequency events are not correlated with microseismic ocean or atmospheric noise sources and volcanic tremor remains a plausible origin. The frequency-power distribution of the high-frequency events indicates a natural origin, and beamforming on these events reveals distinct event clusters, predominantly in the direction of the main peaks of the volcanic complex. Numerical examples show that we can apply conventional beamforming to the data, and that the results are improved by taking the signal-to-noise ratio of individual channels into account.

The increased data quantity of DAS can outweigh the limitations due to the lower quality of individual channels in these hazardous and remote environments. We conclude that DAS is a promising tool in this setting that warrants further development.