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Array observations of seasonal seismic noise variations induced by glacier-fed rapids near Vatnajökull, Iceland

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We analyse semi-continuous noise observed in seismic data from an array installed close to Lakagigar southwest of the Vatnajökull ice cap in Iceland. The noise appears in several distinct frequencies bands between 1 and 10 Hz. The bands have different spectral widths suggesting that several sources are acting simultaneously. The back azimuths obtained from array fk-analysis suggest that the observed noise originates mainly from rapids and waterfalls in Hverfisfljot, a glacial river originating from the glacial tongue Sidujökull in the southwest of Vatnajökull. This observation is supported by stream gauge measurements. The seismic noise is only observed between May and September when the water level exceeds a threshold value that lies above the relatively constant lower water level during the winter months. A more detailed analysis of noise back azimuth, noise slowness and the correlation between seismic noise and river level are expected to improve the understanding of water-flow induced seismic noise. This noise source has to be kept in mind when searching for suitable array locations as this overlaps the typical frequency band of e.g. volcanic or flood related tremor. Additionally the observations demonstrate that seismic array data can be useful to infer river states remotely.