



Analysis of a regional seismic signal from a glacial earthquake at the Helheim glacier, Southeast Greenland

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We analyze the high-frequency content in a seismic signal generated by a glacial earthquake in August 2007 at the Helheim glacier, Southeast Greenland. The nearby location of the installation (in the small settlement of Isertoq, approx. 100 km from the glacier) provides a unique opportunity to observe the otherwise rapidly attenuated high frequencies in the signal. It is clear that there is a significant amount of information to be extracted from the short-period band with periods from 0.1 s - 3 s, i.e. at frequencies higher than the microseism band. This includes detailed information about the seismic activity leading up to the main event - information that can aid the understanding of the glaciological processes involved in glacial earthquakes and the timing thereof. Filtering and plotting the trace reveals a number of smaller events, typically in sets of two, leading up to the main event. These can be interpreted as activity similar to the “rumblings” observed on the Jakobshavn Glacier in 2006-2007 by Rial et. al. An inherent problem with the glacial earthquakes is the issue of localization of the epicenter. Considering all three seismogram components (E, N and Z) we perform a simple analysis of the polarization in order to determine the azimuth of the location of the epicenter relative to the station. This can, in combination with other close stations with different azimuths, support better localization of the glacial events. We will present the experimental configuration, describe the data analysis of the regional seismic signals, and discuss the implications of those results in the context of glacial

earthquakes.