Investigating calving front dynamics with a local seismic-infrasound network (Bowdoin glacier, Greenland)

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Mechanisms governing behavior of calving glaciers and mechanical loss of ice remain among the most poorly documented and represented in numerical models. In this study, an array of on-ice seismic stations, supported with on-rock Broad Band Seismometer and an infrasonic array were temporarily installed near the calving front of a tide-water Bowdoin glacier in northwestern Greenland in July 2015. These unique near-source measurements from the most dynamic and hard-to-access part of the glacier have a potential to provide insights into rapid processes taking place within the glacier and near its margin during ablation period. Hundreds of seismic and infrasonic events per hour were recorded and remain to be analyzed against other conducted geophysical observations, including high-frequency time-lapse records at the calving front. Among detected events were calving episodes, local ice-shocks due to crevassing, collapses of ice cavities, and, presumably, fracturing of ice in response to meltwater discharge and sea tides. Here, some preliminary observations about retrieved signals are introduced and discussed in terms of their connection with overall dynamics of the calving front.