



Long-term changes of the glacial seismicity: case study from Spitsbergen

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Changes in global temperature balance have proved to have a major impact on the cryosphere, and therefore withdrawing glaciers are the symbol of the warming climate. Our study focuses on year-to-year changes in glacier-generated seismicity. We have processed 7-year long continuous seismological data recorded by the HSP broadband station located in the proximity of Hansbreen glacier (Hornsund, southern Spitsbergen), obtaining seismic activity distribution between 2008 and 2014. We developed a new fuzzy logic algorithm to distinguish between glacier- and non-glacier-origin events. The algorithm takes into account the frequency of seismic signal and the energy flow in certain time interval. Our research has revealed that the number of detected glacier-origin events over last two years has doubled. Annual events distribution correlates well with temperature and precipitation curves, illustrating characteristic yearlong behaviour of glacier seismic activity. To further support our observations, we have analysed 5-year long distribution of glacier-origin tremors detected in the vicinity of the Kronebreen glacier using KBS broadband station located in Ny-Ålesund (western Spitsbergen). We observe a steady increase in the number of detected events. detected each year, however not as significant as for Hornsund dataset.