ESC2016-242, 2016
35th General Assembly of the European Seismological Commission

35th General Assembly of the European Seismological Commission
4–10 September 2016
Trieste

Glacier-related seismicity of Svalbard

Andrey Fedorov, Vladimir Asming, and Andrey Hannibal
Kola branch of Geophysical Survey of Russian academy of science, Apatity, Russian Federation (Andrey_V_Fedorov@inbox.ru)

It is known that glacier activity, in particular, destruction of glacier terminus (calving) provides seismic signals – icequakes, which can be observed at seismic station recordings both at local and teleseismic distances. In this work we focused on study of Svalbard glacier-related earthquakes by local permanent and temporal seismic stations.
Svalbard seismic stations record a huge number of icequakes during a year. For automatic processing of their data we used two detectors developed for single station data analysis. The first one is based on polarization analysis for phase type determination (P or S) and back azimuth calculation with autoregressive technique for accurate phase arrival time picking. In addition to detection lists this routine produces estimations of epicenter coordinates. The second detector is simple SNR-detector based on statistical determination of ambient noise level and targeted to the frequency band, specific for icequakes.
We have processed data of three local permanent seismic stations (HSPB, KBS, SPI) for period of time from 2010 to 2015. Additionally we used data of two temporal stations located in Piramida settlement and in vicinity of Esmark glacier that were in operation for different time periods from 2012 to 2015.
Results of the data processing show similar time distributions of number of icequakes for different stations and different glacier areas. Number of such events increases in June, reaches maximum in August – September and decreases in winter months. For some glaciers short periods of seismic activations in winter months were observed. We assume that these activations are associated with the glacier surge processes. Annual number of icequakes increased from year to year for all period of observations.
Funding for this research was provided by Council grants the President of the Russian Federation grant № -5646.2015.5.