



Infrasound research in Spitsbergen

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KB GS RAS has a good experience of joint registration of seismic and infrasound events, their detection and classification. Since 1999 the observations at the seismic and infrasound array "Apatity" are carried out. The array is located in the center of Kola Peninsula. Since 2009 we also have started infrasound observations in Spitsbergen Archipelago. Until then we have assumed that such measurements are not informative because of extremely strong winds there. However, after noise level measurements at three points (Barentsburg, Pyramiden and Ny-Byen) it was found that registration of infrasound signals is possible at an average level of wind noise.

In November, 2010 an infrasound array has been installed near the seismic station BRBB. The stations are located 4 km far from the settlement of Barentsburg to reduce man-made noise. The infrasound array consists of 3 low-frequency microphones. Each microphone is installed with a wind-reducing filter. It was supposed that the infrasound array will record signals from cleaving glaciers while the seismic station will register signals caused by glaciers movements.

132 glaciers are situated in the central and northern part of Spitsbergen, more than 90 of them are surging. Observation of seismicity of the continental part of the Archipelago has revealed a seasonal periodicity of weak seismic events. Maximal numbers of weak seismic events are registered during Septembers and Octobers. One of possible explanations of the periodicity could be seasonal changes of glaciers activity.

It is known that ice breaks cause sharp sounds. Registration of these acoustic waves and their comparison with seismic signals also was the primary goal of our research. Two nearest surging glaciers, Esmark and Nansen, are located to the north and north-east from the stations at distances 20 and 24 kilometers respectively. These glaciers are rather small but a lot of seismic events has been registered in their areas in 2007 and in 2010. Single events were registered also in other years.

During the time from November, 2010 to January, 2012 more than 2000 events of various types have been registered by the infrasound array. We divided them into 7 types:

microbaroms – the long quasiperiodic low-frequency fluctuations connected with movement of ocean waves;

signals caused by flights of planes and helicopters near to the station;

impulse signals from the explosions made during seismic prospecting works near the settlement of Longyearbyen;

impulse signals possibly connected with glaciers calving;

impulse signals caused by work of construction machinery in the settlement of Ny-Alesund;

signals caused by auroras;

signals of unknown origin.

Thus, we have shown the possibility of joint seismic and infrasonic observation of glaciers activity. It is planned to expand the network in future.