グリーンランド氷床における広帯域地震計観測計画

坪井誠司[1]、金尾政紀[2]、東野陽子[1]、姫野哲人[3]、豊国源知[4]、Dean Childs[5]、Trine Dahl-Jensen[6]、Kent R Anderson[7]
[1] *海洋研究開発機構*
[2] *国立極地研究所*
[3] *成蹊大学*
[4] *東北大学*
[5] *IRIS/PASSCAL, NM USA*
[6] *GEUS København, Denmark*
[7] *IRIS, Washington DC, USA*

Continuous broadband seismic observation on the Greenland Ice Sheet under Greenland Ice Sheet monitoring Network

Seiji Tsuboi[1], Masaki Kanao[2] Yoko Tono[1], Tetsuto Himeno[3],
Genti Toyokuni[4], Dean Childs[5], Trine Dahl-Jensen[6], Kent R Anderson[7]
[1]*JAMSTEC, Yokohma, Japan*
[2] *NIPR, Tokyo, Japan*
[3] *Seikei University, Tokyo, Japan*
[4] *Tohoku Univeristy, Miyagi, Japan*
[5] *IRIS/PASSCAL, NM USA*
[6] *GEUS København, Denmark*
[7] *IRIS, Washington DC, USA*

Glacial earthquakes have been observed along the edges of Greenland with strong seasonality and increasing frequency [1-2] since 2002 by continuously monitoring data from the Global Seismographic Network (GSN). These glacial earthquakes in the magnitude range 4.6-5.1 may be modeled as a large glacial ice mass sliding downhill several meters on its basal surface over duration of 30 to 60 seconds. Glacial earthquakes have been observed at seismic stations within Greenland, but the current coverage is very sparse. In order to define the fine structure and detailed mechanisms of glacial earthquakes within the Greenland Ice Sheet, a broadband, real-time seismic network needs to be installed throughout Greenland's Ice Sheet and perimeter. National Institute for Polar Research (NIPR) and Japan Agency for Marine-Earth Science and Technology (JAMSTEC) are members of GLISN and have cooperated to install and maintain broadband seismograph station on the ice sheet in collaboration with IRIS Polar Services since 2011. We have installed ICE-S (DK.ICESG) in June (Figure 1), 2011 in collaboration with IRIS Polar Services. The station is equipped with a CMG-3T broadband seismometer and a Quanterra Q330 data logger. We have visited the station again in May, 2012 and 2013 and successfully retrieved one year of continuous records from the broadband seismometer and updated the telemetry system to eventually allow real time monitoring of the station. Figure 2 shows observed seismograms for April 11, 2013 West of Greenland earthquake (Mw4.6). This figure demonstrates high quality of ICESG seismograms. Continuous broadband seismograms from ICESG station are also available from IRIS DMC as soon as they are retrieved from the observatory.

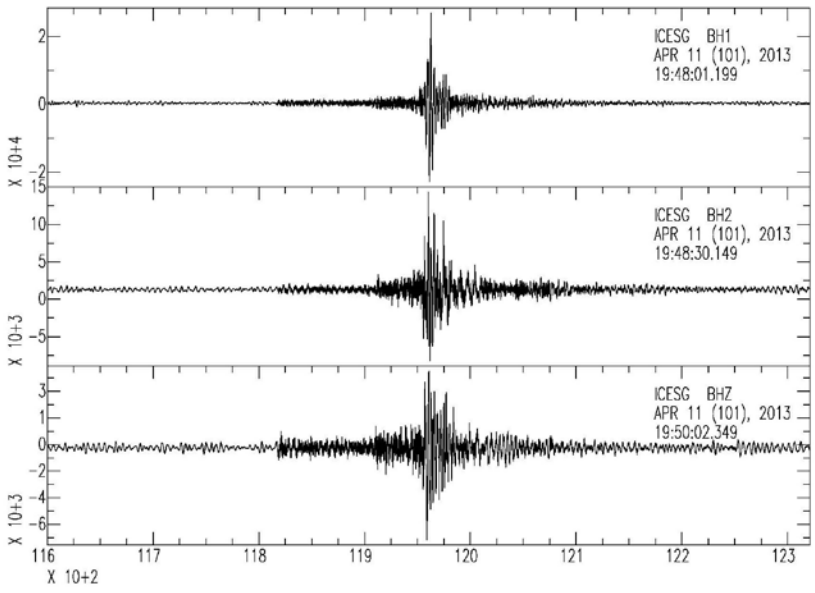

Figure 1. Three component seismograms of ICESG station for April 11, 2013 West of Greenland earthquake.

References

1 Ekström, G., Nettles, M., Abers, G. A., Glacial earthquakes, Science 302, 622-624, doi:10.1126/science.1088057, 2003.

2 Elström, G., Nettles, M., Tsai, V. C., Seasonality and increasing frequency of Greenland glacial earthquakes, Science 311,1756-1758, doi:10.1126/science.1122112, 2006