

Future direction of Greenland broadband seismographic observation project

*Seiji Tsuboi¹, Genti Toyokuni², Masaki Kanao³

1. JAMSTEC, Center for Earth Information Science and Technology, 2. Tohoku University, 3. NIPR

Recent investigations of the causes and consequences of changes in the Greenland ice sheet have highlighted the links between the ice– ocean– atmosphere– solid Earth system and the need for better observations of all four parts of the system. We have conducted continuous broadband seismographic observation under the collaboration with the Greenland Ice Sheet Monitoring Network (GLISN) project—a collaboration between Canada, Denmark, France, Germany, Italy, Japan, Norway, Poland, South Korea, Switzerland, and the United States—which provides real-time broadband seismological observations to help address critical, poorly understood aspects of the Arctic system during the past 6 years. Our broadband seismographic observation consists of maintaining the ice-sheet observatory, ICESG station, which equipped with the broadband seismograph and GPS instrument. The operation has been successfully conducted in collaboration of IRIS PASCAL. The seismograms observed at ICESG station for past 4.5 years has been used to process by the ambient noise surface wave analysis (Toyokuni et al., 2017) to retrieve seismic speed changes beneath the ice-sheet, which has been interpreted as a increase of melt water due to pressure melting at the bottom of the ice sheet. The continuous GPS measurement at ICESG station also reveals horizontal movement of ice sheet, which is consistent to the total ice sheet movement around ICESG station. These results demonstrate that the further continuous observation of both seismographic and geodetic measurement is necessary at the ice sheet station. We plan to maintain ICESG station in collaboration with IRIS PASCAL group and for next several years and discuss the possible extension of research activity in this presentation.

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