[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

## [A-CG38]Science in the Arctic Region

convener:Shun Tsutaki(The University of Tokyo), NAOYA KANNA(Arctic Research Center, Hokkaido University), Shunsuke Tei(北海道大学 北極域研究センター, 共同), Tetsu Nakamura(Faculty of Environmental Earth Science, Hokkaido University)

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The Arctic and circumpolar region is the key area for the study of global change because the anthropogenic impact is projected to be the largest in this area due to the complicated feedback processes of the nature. A number of international and interdisciplinary research projects have been conducted for the studies on the land-atmosphere-ocean system. In order to understand the feedback processes occurring in the Arctic and to project the global warming in the future, we need to establish the intense observational network and to exchange the knowledge and information by combining the different scientific communities under the common interest of the Arctic. The objectives of this session are 1) to exchange our knowledge on the observational facts and integrated modelling and 2) to deepen our understanding on wide range of natural sciences related to the Arctic and the circumpolar region. Studies on humanities, social sciences, and interdisciplinary fields are also welcomed.

# [ACG38-P19]Influence of ocean bed geometry on the ice front variations of Bowdoin Glacier, northwestern Greenland

*Izumi Asaji[1], Daiki Sakakibara[2], Shintaro Yamasaki[3], Shin Sugiyama[4] (1.Graduate School of Environmental Science, Hokkaido University, 2.Arctic Research Center, Hokkaido University, 3.Kitami Institute of Technology, 4.Institute of Low Temperature Science, Hokkaido Univ.)

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The Greenland ice sheet(GrIS) is losing their mass due to reasons such as increasing surface melting and ice discharge from marine-terminating outlet(calving) glaciers. Especially in the southern area of the ice GrIS, mass loss from carving glacier were reported after 2000. This trend is also reported in the northern area of the GrIS in recent years. Bowdoin Glacier is a marine-terminating outlet glacier in northwestern Greenland (77°41’N, 68°35’W), the width of the terminal is about 3 km. The ice front had kept at the same position for 20 years, but the front has retreated rapidly since 2008. A hypothesis why this retreat occerd after 2008 is that the surface elevation of the glacier declined and therefore the buoyancy acting on the front of the glacier approached the gravity, as a result, the carving was promoted and a rapid recession occurred. However, the verification of this hypothesis is not sufficient, because there are few observations at the site in the northern area of the GrIS. In this study, in order to clarify the details of the bed topography and how much surface elevation was up to Flotation level (surface elevation at which gravity and buoyancy balance equilibrium to ice), we measured the bed topography of the fjord in front of the glacier and the surface elevation of the glacier. Then we discussed the flotation level by using, on-site observation and satellite data analysis on the Bowdoin glacier.

We measured the bed topography at the fjord in front of the Bowdoin glacier on July 29, 2016 by using a boat with a sonar and a transducer. The ice thickness at the glacier was measured using ice radar and the surface elevation of the glacier was measured by GPS kinematic survey at the same point. Surface elevation from 2001 to 2012 was also acquired from DEM (digital elevation model) created from images taken by optical sensors of artificial satellites Terra and ALOS. Then, we calculated the elevation of the bed topography under the glacier by subtracting the ice thickness from the surface elevation of the glacier.As a result, the depth in front of the glacier were 280 m in the west side and 180 m in the east side at maximum.

The surface elevation of the glacier had declined at 2.8 m $a^{-1}$ on average from 2001 to 2012. Comparing the surface elevation with the Flotation level, the glacial surface elevation in 2001 was more than 10 m higher than the Flotation level. However, the surface elevation was 0 - 10 m below the flotation level in the west side of the glacier in 2007. Therefore, the Bowdoin glacier has, reached a condition to float on water in a wide area on the west side of the glacier, and it might cause to greatly retreat the ice front.