**3.065 Production of bromoform in sea ice and emission to the atmosphere.**

Presenting Author:
Daiki Nomura, Faculty of Fisheries Sciences, Hokkaido University, Hakodate, Japan., daiki.nomura@fish.hokudai.ac.jp

Co-Authors:
Atsushi Ooki, Faculty of Fisheries Sciences, Hokkaido University, Hakodate, Japan.
Ellen Damm, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany.
Gerhard Dieckmann, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany.
Bruno Delille, Université de Liège, Liège, Belgium.
Markus Frey, British Antarctic Survey, Natural Environment Research Council, Cambridge, United Kingdom.
Mats Granskog, Norwegian Polar Institute, Tromsø, Norway.
Klaus Meiners, Antarctic Climate and Ecosystems Cooperative Research Centre, University of Tasmania, Hobart, Australia. Australian Antarctic Division, Kingston, Australia.
Anna Silyakova, Centre for Arctic Gas Hydrate, Environment and Climate, Tromsø, Norway.
Takeshi Tamura, National Institute of Polar Research, Tokyo, Japan.
Jean-Louis Tison, Université Libre de Bruxelles, Bruxelles, Belgium.
Takenobu Toyota, Institute of Low Temperature Science, Hokkaido University, Sapporo, Japan.
Youhei Yamashita, Faculty of Environmental Earth Science, Hokkaido University, Sapporo, Japan.

Abstract:

Bromoform (CHBr₃) is one of the important bromine containing volatile halocarbons that are involved in ozone depletion in the atmosphere. Although the possible source of reactive bromine species from snow and sea ice has been discussed, mechanisms that control CHBr₃ production within sea ice and emission to the atmosphere remain unclear. Here, we show evidence of massive CHBr₃ production at sea ice surface-snow interfaces and its strong emission to the atmosphere from five field-campaigns to the Arctic Ocean, the Southern Ocean, and the Sea of Okhotsk in the winter and spring, in addition to supporting laboratory experiments. We found that the ice-related strong CHBr₃ emission was linked to the production of the CHBr₃ at the snow-sea ice interface through the haloform reaction. Our results suggest that sea ice acts as a strong CHBr₃ source for the atmosphere, indicating a significant contribution to the atmospheric bromine cycle.