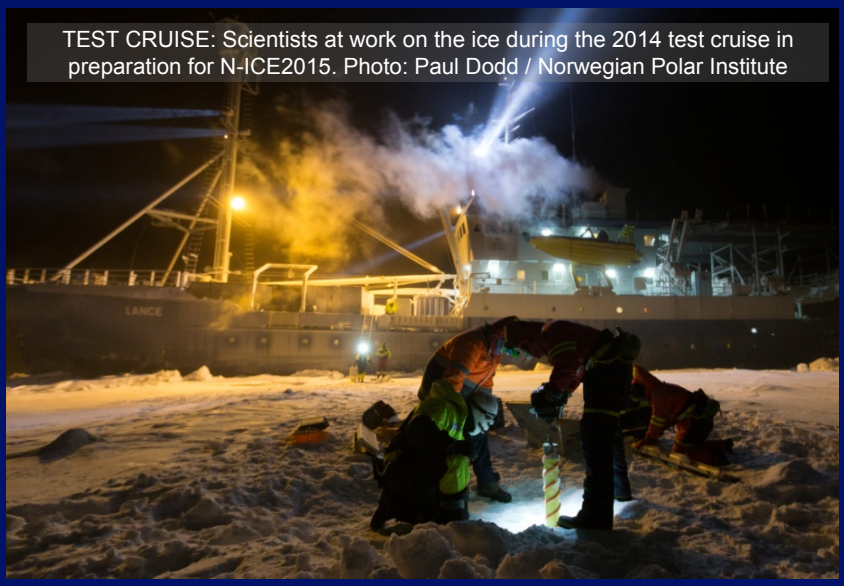
The Fifth Symposium on Polar Science, National Institute of Polar Research (NIPR), Tokyo, Japan, 2-5 December 2014

Mid-winter freeze experiment in the Arctic Ocean: Norwegian Young sea ICE cruise (N-ICE2015)

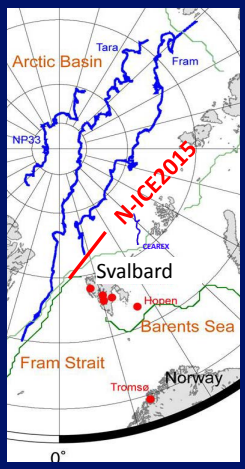
Daiki Nomura[1, 2], M.A. Granskog[3], A. Fransson[3], A. Silyakova[4], S. Hudson[3], M. Chierici[5], P. Assmy[3], B. Delille[6], M. Kotovitch[6], G.S. Dieckmann[7], H. Steen[3]

[1] *Institute of Low Temperature Science, Hokkaido University, Sapporo, Japan.*
[2] *Japan Society for the Promotion of Science, Tokyo, Japan.*
[3] *Norwegian Polar Institute, Tromsø, Norway.*
[4] *CAGE, Centre for Arctic Gas Hydrate, Environment and Climate, Tromsø, Norway.*
[5] *Institute of Marine Research and the Fram Centre, Tromsø, Norway.*
[6] *Université de Liège, Liège, Belgium.*
[7] *Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany.*

N-ICE2015
NORWEGIAN YOUNG SEA ICE CRUISE



TEST CRUISE: Scientists at work on the ice during the 2014 test cruise in preparation for N-ICE2015. Photo: Paul Dodd / Norwegian Polar Institute



DRIFT PATH AND LANCE: The RV *Lance* will freeze into the ice north of Nordaustlandet, Svalbard, and passively drift with the ice, likely in a SW direction. Map: Norwegian Polar Institute, Lance picture: Peter Leopold.

In mid-January 2015, RV Lance will freeze into **the ice north of Svalbard, Arctic Ocean** at around 83.25°N 30°E, and passively drift with the ice as part of the Norwegian Young sea ICE cruise (**N-ICE2015**). Judging from historic sea ice drift trajectories, it is likely that RV Lance will drift in a SW direction and the ship will probably be freed from the ice in mid spring after about two to three months of drift. Thereafter, RV Lance will return to her starting position and start a new drift. Under all circumstances, the ice drift project will **end in late June 2015**. Throughout the cruise the focus will be on **the interaction of the atmosphere-ice-ocean system and the response of the marine ecosystem to the thinner ice regime**. The overall goal of the project team is to improve our understanding of **the role of the younger ice pack in the Arctic on greenhouse gas fluxes and to ultimately assess whether the Arctic Ocean is a sink or source of greenhouse gases.**

We plan to conduct **long-term synchronous observations** of Arctic snow and sea ice **biogeochemistry and physics and fluxes of carbon dioxide, methane, nitrous oxide and bromoform**. This work targets at filling a crucial gap in our understanding of the role of Arctic sea ice in the climate system. This is done by conducting state of the art observations on Arctic sea ice in the polar night, when observations are basically non-existent. Further we are focusing on the new thinner ice regime, which is even less documented. We aim to understand how the thinner sea ice in the Arctic basin contributes **(i) to important greenhouse gas exchange between the atmosphere and ocean and (ii) to aerosol formation, that contribute to the radiative balance of the planet.** This work will increase direct **collaboration between Japanese and European scientists** in the Arctic, and combines complimentary expertise and experience from several international partners to carry out the interdisciplinary work proposed.

TEST CRUISE: Scientists at work on the ice during the 2014 test cruise in preparation for N-ICE2015. Photo: Paul Dodd / Norwegian Polar Institute