About ice2ice

The cryosphere is in fast transition. The possibility that the ongoing rapid demise of Arctic sea ice may instigate abrupt changes on the Greenland Ice Sheet (GIS) is, however, not tackled by current research. Ice cores from the GIS show clear evidence of past abrupt warm events with up to 15 degrees warming in less than a decade, most likely triggered by rapid disappearance of Nordic Seas sea ice.

At present, both Arctic Sea ice and the GIS are in strong transformation: Arctic sea-ice cover has been retreating during most of the satellite era and in recent years, Arctic sea ice experienced a dramatic reduction, and the extent was in 2012 half of the 1979-2000 average. Satellite data document an increasing loss of GIS ice mass and temperatures since 1990 and temperatures have risen markedly at the GIS summit.

Strong transient responses in both major Arctic cryospheric entities prompts the question: Is the dramatic decline in Arctic Sea Ice heralding a new phase of abrupt change, similar to those recorded in ocean sediments and ice cores? Such changes would have major consequences for the GIS mass balance and global climate, including accelerated sea level rise. There is currently no concerted research effort to assess this risk.

Ice2ice will approach this complex problem by integrating 4 teams from three Nordic world class research centres; the Niels Bohr Institute (DK), Danish Meteorological Institute (DK), UniReserach (N) and the Bjerknes Centre for Climate Research (N). Comprising empiricists and dynamicists specialized in Arctic and Greenland atmospheric, oceanic and cryospheric sciences.

ice 2 ice

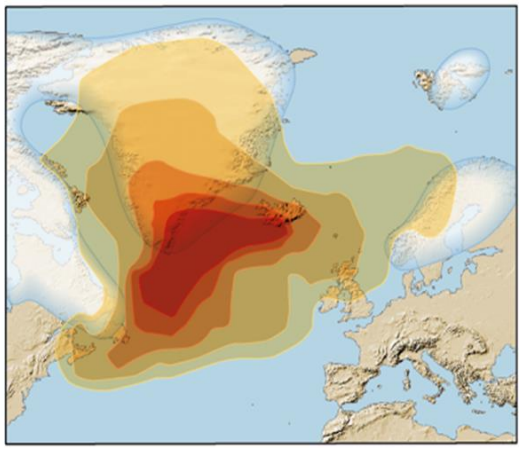
Funded by the ERC Synergy grant

Twitter: #ice2ice

www.ice2ice.eu

ice2ice

Funded by an ERC synergy grant



What if Arctic Sea ice disappears?

erc
European Research Council

uni Research

Primary investigators

Eystein Jansen
Professor
Bjerknes Centre for Climate Research,
University of Bergen
Phone: (+47) 55 58 34 91
email: eystein.jansen@uni.no

Jens Hesselbjerg Christensen
Scientific Head
Danish Climate Centre
Danish Meteorological Institute
Phone: (+45) 39157428
email: jch@dmi.no

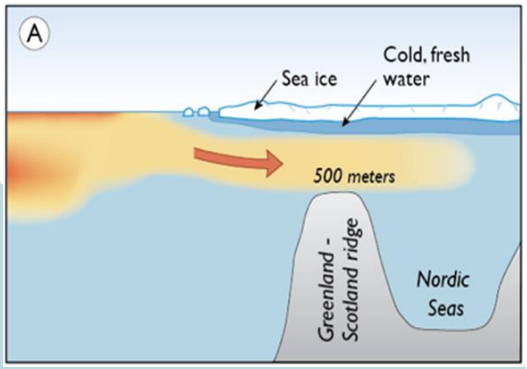
Kerim Hestnes Nisancioglu
Associate Professor
Bjerkes Centre for Climate Research
University of Bergen
Phone: (+47) 55589866/ (+47) 98049414
email: Kerim@geo.uib.no

Bo Møllesøe Vinther
Associate Professor
Centre for Ice and Climate
University of Copenhagen
Phone: (+45) 35320518
email: bo@gfy.ku.dk

The **University of Bergen** and **Uni Research Climate** are both partners in the **Bjerknes Centre for Climate Research**(BCCR) that comprises internationally renowned groups in paleoceanography, of the North Atlantic and the Nordic Seas, and the largest climate modeling group in Northern Europe, with state-of-the art Earth System models and regional and ice sheet models. BCCR has world-class competence in ocean and sea ice dynamicsCenter for Climate and Ice.

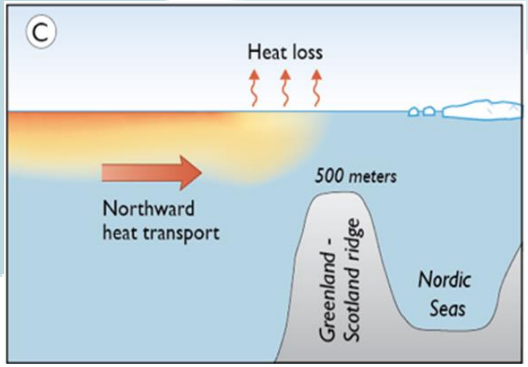
Niels Bohrs Institute (NBI) at **Copenhagen University** is the prime European centre for studies of the past and present dynamics of the Greenland Ice Sheet using ice core data, and has unique world class competence in the complex logistics of retrieving ice core material and developing proxy methods for reconstructing past climate from ice cores.

The **Danish Climate Centre** at **Danish Meteorological Insititute** (DMI) is the Danish Centre of excellence and a leading centre internationally for regional climate studies, regional downscaling of climate simulations with a unique expertise on the regional climates of Greenland and the Arctic. DMI also hosts leading competence on sea ice observations from remote sensing.



"Main Hypothesis:

Arctic and sub-Arctic sea ice cover excerts important controls on past and future Greenland temperature and ice sheet variations.



ice2ice objectives

- Map and synchronize marine sediment and ice cores to identify coinciding rapid changes.
- Develop and synchronize sea ice proxies in ice cores on Greenland and marine sediment cores from the Arctic for Marine Isotope Stage 3 (MIS3).
- Employ a suite of models to address rapid change in present day, future and past Arctic climates.
- Determine the dynamics, including atmospheric forcing, governing rapid changes in sea ice cover during Dansgaard-Oeschger (D-O) events, and analyse the stability of modern Arctic Ocean stratification in view of these findings.
- Determine the impact of such rapid changes in sea ice on the mass balance of the Greenland ice sheet.
- Assess the likelihood for future impacts of sea ice change on Greenland ice sheet mass balance and dynamics, and the potential influence of Greenland ice sheet reductions on sea ice cover.

The ice2ice program is funded by the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013) / ERC grant agreement n°[610055].