



How sea ice could be the cold beating heart of European weather

I. M. Ringgaard (1,2), S. Yang (2), J. H. Christensen (1,2), and E. Kaas (1)

(1) Climate and Geophysics, Niels Bohr Institute, University of Copenhagen, Denmark (iri@dmi.dk), (2) Danish Meteorological Institute

Arctic sea ice has been retreating during most of the satellite era and in recent years, Arctic sea ice experienced a dramatic reduction: the summer extent in 2012 and 2016 was only half of the 1979-2000 average. In the past, a rapid decrease in Nordic Seas sea ice most likely triggered the abrupt warming events with up to 15 degrees warming in less than a decade found in ice cores from the Greenland Ice Sheet. With such dramatic changes in the current sea ice coverage as a point of departure, several studies have linked reduction in wintertime sea ice in the Barents-Kara seas to cold weather anomalies over Europe and through large scale tele-connections to regional warming elsewhere. Here we aim to investigate if, and how, Arctic sea ice impacts European weather, i.e. if the Arctic sea ice works as the 'cold heart' of European weather. To understand the effects of the sea ice reduction on the full climate system, a fully-coupled global climate model, EC-Earth, is used. A new energy-conserving method for assimilating sea ice using the sensible heat flux is implemented in the coupled climate model. Using this new method, experiments are performed with reduced sea ice cover in the Barents-Kara seas. Results indicate an increase in extreme cold winters over Europe as a response to this reduction in sea ice cover. Here we present some preliminary analysis of the chain of processes responsible for this apparent teleconnection.