Geophysical Research Abstracts
Vol. 16, EGU2014-1545, 2014
EGU General Assembly 2014


# Turbulent fluxes over Barents Sea: Intercomparison of satellite and modeling data products

Igor Esau

Nansen Environmental and Remote Sensing Centre, G.C. Rieber Climate Institute, Bergen, Norway (igor.ezau@nersc.no, +47 55 205801)

Barents Sea is recognized as one of the key regions with strong natural climate variability and a pronounced climate response following the anthropogenic global warming. It was found that the regional atmospheric circulation responds on variations in the heat inflow through the Barents Sea opening. Physical mechanisms of this response are however debated. In particular, magnitudes of the area averaged turbulent heat fluxes over open water and fractional ice covered areas are known with large uncertainties. Better constraints on the magnitudes of turbulent fluxes are needed to assess sensitivity of the sea ice extent simulations in the climate models. The large inter-model scatter in CMIP3 simulations dominated the Arctic temperature variability precluding statistically robust identification of the global warming signal in the area. The recent CMIP5 simulations did not show any reduction of the inter-model scatter in the area with majority of the models having too much sea ice in the Barents Sea. This study analyses several reanalyses and satellite products as well as 600 years control climate simulations with the Bergen Climate Model (BCM). The data set intercomparison revealed no universal the sea ice cover (SIC) – surface heat loss dependence for the data sets. The problem was attributed to parametrization of the turbulent fluxes over fractured sea ice surface under convective atmospheric conditions. Significant discrepancies were found between both the satellite turbulent flux products and reanalyses. Theoretical analysis supported with the long-term BCM run suggested that the area averaged flux – SIC dependence is sensitive to the SIC area in the region. Small initial SIC makes the SIC and the total heat loss less sensitive to the variations in the ocean heat inflow but more sensitive to the atmospheric conditions, whereas large initial SIC results in stronger sensitivity the ocean heat inflow.