Geophysical Research Abstracts
Vol. 17, EGU2015-14309-1, 2015
EGU General Assembly 2015

Performance of CMIP5 models in the Subpolar North Atlantic: Using control simulations to identify uncertainties in the prediction of key climate properties

Nadine Goris (1,2), Jörg Schwinger (2,3), Jerry Tjiputra (2,3), Christoph Heinze (1,2), Are Olsen (1,2)

(1) University of Bergen, Geophysical Institute, Bergen, Norway (nadine.goris@gfi.uib.no), (2) Bjerknes Centre for Climate Research, Norway, (3) Uni Climate, Uni Research, Norway

The Subpolar North Atlantic (SPNA) is a region of key interest when it comes to projecting the carbon uptake of future climate scenarios. This interest is based on the fact that the SPNA is one of the most effective carbon sinks (per unit area). Its uptake efficiency is associated with deep water formation. Recent analyses of observations have identified the physics of the SPNA to be very sensitive to climate change and climate variability. Consequently, the SPNA carbon uptake is expected to react very sensitive to changes in climate, which has been confirmed by some recent observational studies. Yet it remains unclear how the carbon uptake of the SPNA will alter in the future, and the skills of present day Earth System Models in forecasting the SPNA's climate variations is limited as the details of interacting physical and biogeochemical variations are not fully understood.

The IPCC AR5 report utilizes CMIP5 Earth System Models as state of the art modeling tools for calculating the outcome of future climate scenarios. Yet, especially on the sub-regional scale, the performance of these models is not well assessed and it remains unclear if they are able to accurately forecast key climate properties. As an approach of assessing the ability of several CMIP5 models to forecast the future behavior of the SPNA, we are investigating the models' performance in hindcasting the natural variability of the SPNA. We are investigating physical key climate properties (NAO, AMO, AMOC) using available data and compare these to a selection of CMIP5 models. Here, we quantify biases and temporal discrepancies of these models and translate these into uncertainties in predicting the SPNA carbon uptake.