Project:	**941**
Project title:	**Investigation of Labrador Sea Dynamics with the High-Resolution Finite Element Sea Ice – Ocean Model FESOM**
Project lead:	**Prof. Dr. Gerrit Lohmann, Christopher Danek**
Report period:	**1/2016 – 12/2016**

1 Project report

In 2016 we performed FESOM spinup experiments with different eddy-resolving mesh configurations on DKRZ Mistral. Each of the spinup cycles were forced with the COREv2 atmospheric reanalysis data for the period 1948–2009 (Large and Yeager, 2008). All experiments were initialized from the PHC3 temperature and salinity climatology (Steele et al. 2001).

We evaluated the results of the eddy-resolving mesh configurations based on the mass properties and dynamical structure of the North Atlantic as well as the modeling of Labrador Sea Water (LSW) modes. We found improvements but also deficiencies in the meso-scale resolving model, when compared to the coarse resolution control run of Scholz et al. (2013, 2014).

For example, the modeled basin-scale water mass properties (Fig. 1) and kinetic energy in the meso-scale resolving experiment in the North Atlantic fit better to observations compared to the control run. On the other hand, the enhanced meso-scale ocean dynamics in the high resolution experiment lead to an increase in salinity in the Labrador Sea and thus decrease the ability of the model to simulate the formation of LSW modes.

As a consequence, we used the ability of FESOM of a local mesh refinement and investigate the potential of a better representation of the North Atlantic subtropical gyre (STG) as well as the path and separation of the Gulf Stream and the North Atlantic Current (NAC) for the modeling results of LSW modes. Hence, we started a spinup of a modification of the meso-scale resolving setup at the end of 2016.

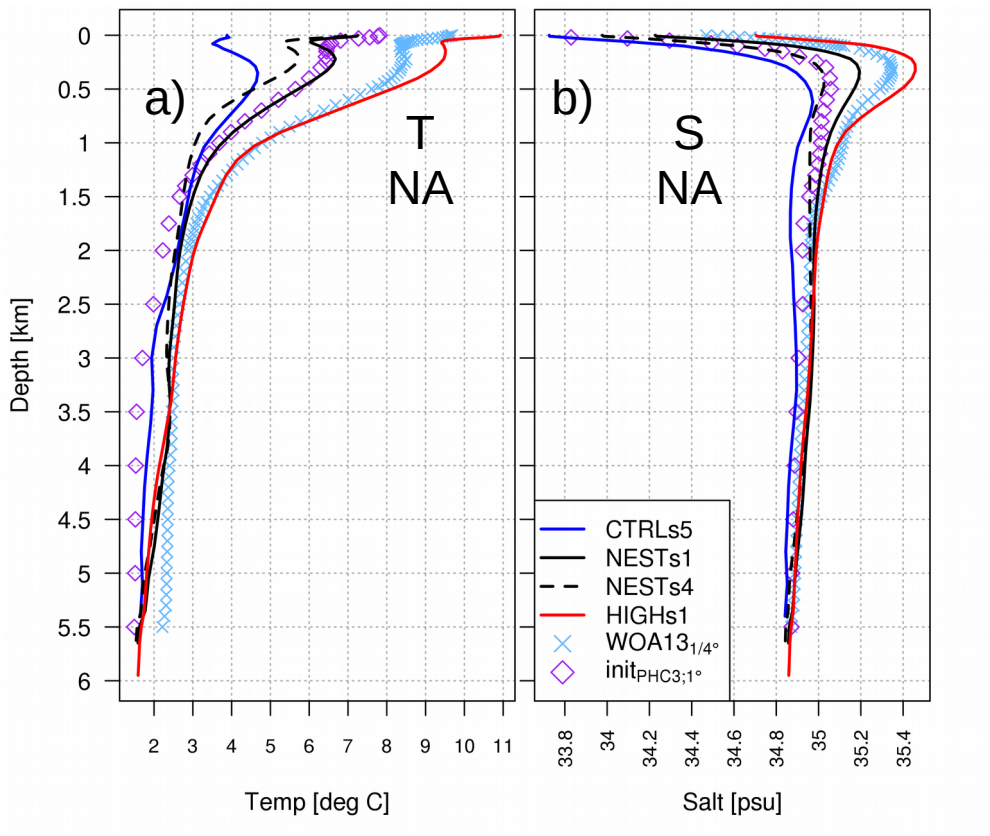

Fig. 1: Climatology (1957–1984) of modeled (lines) and observations (symbols) temperature (a, in °C) and salinity (b, in psu) in the North Atlantic. WOA13 denotes World Ocean Atlas 2013v2 (1955–1984, Zweng et al. 2013), init is the PHC3 data (Steele et al. 2001) from which each experiment was initialized from. The prefix 's1' denotes the number of spinup of the model.

Literature

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