



The effect of Ocean resolution, and external forcing in the correlation between SLP and Sea Ice Concentration in the Pre-PRIMAVERA GCMs

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Recently, an observational study has shown that sea ice variations in Barents Sea seem to be important for the sign of the following winter NAO (Koenigk et al. 2016). It has also been found that amplitude and extension of the Sea Level Pressure (SLP) patterns are modulated by Greenland and Labrador Seas ice areas. Therefore, Earth System Models participating in the PRIMAVERA Project are used to study the impact of resolution in ocean models in reproducing the previously mentioned observed correlation patterns between Sea Ice Concentration (SIC) and the SLP. When using ensembles of high ocean resolution (0.25 degrees) and low ocean resolution (1 degree) simulations, we found that the correlation sign between sea ice concentration over the Central Arctic, the Barents/Kara Seas and the Northern Hemisphere is similar to observations in the higher ocean resolution ensemble, although the amplitude is underestimated. In contrast, the low resolution ensemble shows opposite correlation patterns compared to observations. In general, high ocean resolution simulations show more similar results to observations than the low resolution simulations.

Similarly, in order to study the mentioned observed SIC-SLP relationship reported by Koenigk et al (2016), we analyzed the impact of the use of pre-industrial and historical external forcing in the simulations. When using same forcing ensembles, we found that the correlation sign between SIC and SLP does not show a systematic behavior dependent on the use of different external forcing (pre-industrial or present day) as it does when using different ocean resolutions.