

Arctic sea ice variability, trend and interaction with the North Atlantic in forced NEMO-CICE simulations over the last 60 years

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We have performed several NEMO GO6.0 / CICE GSI8.1 simulations with different atmospheric forcing data (CORE, DFS, NCEP) and different sea ice physics. A sea ice mass analysis shows large differences regarding the sea ice mass, the summer sea ice area and the contributing terms. Results are most realistic for optimised sea ice settings based on a comparison of a stand-alone sea ice simulation with sea ice thickness estimates from Cryosat-2. With respect to default CICE settings the sea ice mass is 60% larger during winter and 400% larger in summer. This is largely caused by a reduction in the basal melt flux by 40%. In this simulation, winter sea ice thickness in the Central Arctic shows no trend between 1960 and 2000 varying around 3m and decreases to 2.5m afterwards. Variability and trend of Arctic wide and regional sea ice area and volume are analysed to examine the impact of changes in the ocean heat transport (from the Atlantic into the Arctic Ocean) and atmospheric changes (incoming longwave radiation and 850hPa air temperature) at different seasons.