Comparison of NEMO surface freshwater adjustments and climatologies

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We have carried out a set of simulations from 1958–2015 with the newest NEMO v3.6 model in the ORCA1 75 level grid forced with the DFS5.2 atmospheric data. As this new NEMO version is the ocean component of several CMIP6 climate models, it is important to comprehensively assess its realism and sensitivity to configuration settings. For this study, we tested combinations of freshwater adjustment settings, consisting of the freshwater balance and surface salinity restoring options, and diagnosed their influence on various aspects of NEMO performance. The freshwater balance is determined by evaporation, precipitation and river runoff. In ocean-ice models, resetting the freshwater balance and/or using the surface salinity restoring option prevents an unrealistic drift of the sea surface height due to errors in the prescribed freshwater balance components. We mutually compare output of our simulations, where freshwater adjustments were either turned on and off, or their magnitude was tuned. We also compare the simulation output to observational climatologies, such as WOA13 and PHC3, focusing on hydrography, ocean circulation, including the AMOC, and sea ice.