Geophysical Research Abstracts
Vol. 18, EGU2016-2905, 2016
EGU General Assembly 2016


# An assessment of the Arctic Ocean in a suite of interannual CORE-II simulations: Hydrography and fluxes

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We compare the simulated Arctic Ocean in fifteen global ocean-sea
ice models in the framework of the Coordinated Ocean-ice Reference Experiments, phase II (CORE-II). Most of these models are the ocean and sea-ice components of the coupled climate models used in the Coupled Model Intercomparison Project Phase 5 (CMIP5) experiments. We mainly focus on the hydrography of the Arctic interior, the state of Atlantic Water layer and heat and volume transports at the gateways of the Davis Strait, the Bering Strait, the Fram Strait and the Barents Sea Opening. We found that there is a large spread in temperature in the Arctic Ocean
between the models, and generally large differences compared to the observed temperature at intermediate depths. Warm bias models have a strong temperature anomaly of inflow of the Atlantic Water entering the Arctic Ocean through the Fram Strait. Another process that is not represented accurately in the CORE-II models is the formation of cold and dense water, originating on the eastern shelves. In the cold bias models, excessive cold water forms in the Barents Sea and spreads
into the Arctic Ocean through the St. Anna Through. There is a large spread in the simulated mean heat and volume transports through the Fram Strait and the Barents Sea Opening. The models agree more on the decadal variability, to a large degree dictated by the common atmospheric forcing. We conclude that the CORE-II model study helps us to understand the crucial biases in the Arctic Ocean. The current coarse resolution state-of-the-art ocean models need to be improved in accurate representation of the Atlantic Water inflow into the Arctic and density
currents coming from the shelves.