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Simulations of the Arctic Boundary Current in an eddy-resolving global ocean model

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The Arctic Ocean is shielded from winds by sea ice and is strongly stratified, resulting in extremely low mixing rates. In this quiescent ocean, currents along the continental shelves become the principal dynamical features of the circulation. Observations and model results suggest the existence of a fast oceanic current in the Arctic Ocean, the Arctic Circumpolar Boundary Current (ACBC). The current flows counterclockwise (cyclonically) along the shelf break of the Siberian, Alaskan and Canadian Arctic shelves all way around the Arctic Ocean margins, leaving through western Fram Strait, and taking about two decades to complete the circuit (Aksenov et al., 2011). Simulations with an eddy-resolving global 1/12 degree NEMO model show that the ACBC consists of several jets with the fastest flow occurring at the shelf break. We compare the models results with observations and examine mechanisms driving the ACBC. Through the analysis of the NEMO simulations performed with eddy-resolving, eddy-permitting and non-eddying model configurations we investigate the effect of resolution on the current.

Reference

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