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## Abstract View

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## A Numerical Investigation of Arctic Ocean Dynamics

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### ABSTRACT

A barotropic numerical model of the Arctic Ocean is formulated to include irregular basin shape, variable bathymetry, lateral friction, bottom drag, and nonlinear advection terms. Source-sink distributions around the perimeter of the basin are used to represent exchange between the Arctic and other portions of the world ocean and the actual bathymetry is parameterized to simulate the effects of weak stratification. The model ocean is spun up using averaged annual wind stress distributions for the Arctic and numerically simulated under-ice stress distributions.

A number of computer runs were made using what were thought to be appropriate parameter ranges for the Arctic. The controlling dynamics in the development of the circulation was discussed for a number of cases and some comparisons made between the model results and observed circulation patterns.

The results of the investigation indicate that topographic Rossby waves play a dominant role in the development and maintenance of general circulation of the Arctic. The intensification of the Beaufort Gyre along the north coast of Alaska is seen to be dynamically similar to the western boundary currents found in mid-latitude oceans, the major difference being that bathymetric variations take over the significance that variations in the Coriolis parameter assume in mid-latitude cases.

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