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A Quasi-Geostrophic Circulation Model of the Northeast Pacific. Part I: A Preliminary Numerical Experiment

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ABSTRACT

A limited-area quasi-geostrophic numerical model with mesoscale resolution is developed to study the circulation in the northeast (NE) Pacific Ocean. The model domain extends from the British Columbia-Alaska coast out to 170°W and down to 45°N, and incorporates the coastline geometry and bottom topography of the region. A long-term integration was conducted using a steady climatological wind stress curl field to drive the circulation. Several statistical properties of the solution are determined and compared with observations.

A cyclonic circulation develops in the model basin with a meandering Alaska Current feeding, at the head of the Gulf of Alaska, into an intense boundary current corresponding to the Alaskan Stream. The head of the Gulf is a region where anticyclonic closed streamline features are occasionally generated with characteristics resembling those of the Sitka Eddy. In the downstream region, the boundary current separates and is subject to lateral meandering due to topographic waves. The occurrence of perturbations with similar characteristics in the Alaska Stream has recently been verified in satellite IR imagery.

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