Abstract View

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A Quasi-geostrophic Circulation Model of the Northeast Pacific. Part II: Effects of Topography and Seasonal Forcing

Patrick F. Cummins

Institute of Ocean Sciences, Sidney, British Columbia, Canada

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ABSTRACT

A quasi-geostrophic regional model of the northeast Pacific is used to investigate the effects of bottom topography and seasonal wind forcing on the circulation of the Alaskan Gyre. In a numerical experiment with a flat bottom and steady forcing the most energetic signal is due to mesoscale eddies with a 100-day period associated with barotropic wave propagation along the Aleutian Island arc. Bottom topography eliminates this signal and causes the flow fluctuations to be of lower frequency and primarily in the first baroclinic rather than the barotropic mode. Experiments with a climatological seasonal cycle in the wind field show that bottom topography has an important influence in moderating the intensity of the seasonal response. It is suggested that the very substantial seasonal variations of the Alaskan Gyre transport obtained in previous numerical studies of the NE Pacific are due to the failure of these models to include or to resolve adequately the bottom topography.