Abstract View

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A Numerical Model Investigation of Tides and Diurnal-Period Continental Shelf Waves along Vancouver Island

Roger A. Flather

Proudman Oceanographic Laboratory, Bidston Observatory, Birkenhead, Merseyside, England

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ABSTRACT

A numerical model study of the tidal regime west of Vancouver Island is presented. Ale model employed is a nonlinear barotropic two-dimensional tidal model incorporating realistic bathymetry. The M_2 and K_1 constituents are examined and comprehensive comparisons between computed and observed elevations and currents are given.

For M_2, the model reproduces observed motion very accurately. However, K_1 is of greater interest since it contains a substantial contribution in the form of a continental shelf wave (CSW). The model correctly predicts the existence of the CSW but, consistent with the neglect of stratification and the influence of mean flows, underestimates its wavelength. It is shown that the CSW component of K_1 is generated by the tidal flow in Juan de Fuca Strait.

The influence of mean currents on the tidal regime is investigated by including them in a further model solution. Consistent with theory, the wavelength of the CSW component of K_1 is increased, giving improved agreement with observations.