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On Long-Wave Disturbances of Dynamic Height in the North Pacific

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ABSTRACT

Long-wave disturbances of dynamic height in the North Pacific are investigated by means of closely spaced STD (salinity, temperature, depth) stations and are related to atmospheric forcing. Wavelike disturbances with length scales between 400 and 600 km are common in the latitude range between 20° and 50° N. The wave amplitudes are larger in the western than in the central and eastern Pacific, and they depend upon season. A large eastward decrease in wave amplitude is observed near the Emperor seamount chain. The wavelike disturbances extend to several hundred meters' depth, with an exponential-type decrease in wave amplitude. The baroclinic currents associated with the dynamic height perturbations are an order of magnitude larger than the mean currents. The perturbations are related to atmospheric forcing, in particular the curl of the wind stress field. Where the distribution of the curl is zonal, meridional waves are excited, which are reflected in north–south dynamic height sections. Where several forcing regions by the curl of the wind stress coexist, the observed dynamic height sections show complex and asymmetric perturbations. The observed 400–600 km wavelengths are commensurate with planetary waves of diverse origin; the exact processes of their formation are poorly understood at present.

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