TOPOGRAPHIC EFFECT FOR ROSSBY WAVES ON A SHEAR FLOW

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This study presents a comparative analysis of the influence of topography, β-effect, and gradient variability of a background flow on the propagation of barotropic topographic Rossby waves. The novelty of this study lies in the fact that non-zonal shear flow and non-zonal topographic changes are considered. The transition to non-zonality is the cause of significant changes in the mathematic analysis of the basic equations since the operator ceases to be Hermitian in this case. In this work, the effect of stratification is excluded based on the already obtained results that short waves are practically not observed, and the effect of stratification on Rossby long waves is insignificant. The transverse variability of the shear plane-parallel flow in the WKB approximation is studied. This allows us to obtain a dispersion relation for flat barotropic topographic Rossby waves, simultaneously taking into account the above conditions. The estimates of the dispersion equation terms are obtained for the Kuroshio Extension area, where flow branch turns to the northeast and makes an angle of 55Æ with latitude. In general, it is established that the classical isolines remain dominant in the dispersion relation although other components can also affect the Rossby waves.