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The Scattering of Rossby Waves by a Semi-Infinite Barrier

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ABSTRACT

We discuss the scattering of divergent Rossby waves by a semi-infinite vertical barrier of arbitrary orientation on a β plane. The Wiener-Hopf method is used to obtain an integral representation of the scattered wave field which, in turn, gives explicit expressions for the scattered velocity components along the axis of the barrier and the pressure difference across the barrier. Far from the corner of the barrier the solution, in part, consists of a scattered wave whose amplitude falls off as $1/r^{1/2}$ but whose phase travels radially inward and at the same time advects westward. Also, the barrier gives rise to the familiar reflected wave and shadow zone regions. However, because of the anisotropic nature of Rossby waves, these regions are determined by the direction of incident energy propagation, which is always different from the direction of the incident phase velocity.

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