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The Propagation of Internal Waves in a Geostrophic Current

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ABSTRACT

The paper presents the WKB theory of internal wave propagation in a large-scale geostrophic mean flow with vertical as well as horizontal shear. As an application a mean flow with isopycnals having constant slope but arbitrary spacing is considered and the behavior of waves at turning points and critical layers is discussed. In particular, it is shown that horizontal variations of the mean flow shift the critical layer to the interior of the wave guide, i.e., away from $\omega_0^2 = f^2$, where ω_0 is the intrinsic frequency, and produces a valve effect at the critical layer which can be penetrated by a wave incident from one side while incidence from the other side results in absorption.

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