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Reynolds Number Dependence of Internal Gravity Wave Dynamics near a Critical Level A. ABDILGHANIE, P. DIAMESSIS, Cornell U., J. ROTTMAN, SAIC — The interaction of an internal gravity wave packet with a steady background shear flow near a critical level is studied through two-dimensional numerical simulations. Use of a spectral multidomain penalty method and spectral filtering ensures numerical stability without sacrificing spectral accuracy at high Reynolds numbers, where simulations are typically under-resolved. The spatial adaptivity of the multidomain scheme enables flexible resolution of the critical layer region. A mechanical forcing technique is used to generate a vertically localized monochromatic wave-packet propagating towards the background current. The behavior of the waves near the critical level is studied for low and finite amplitude waves. Momentum transfer between the waves and the mean flow is carefully assessed over a broad range of Reynolds numbers. The effect of Reynolds number is also considered in terms of the role of shear intensification and static instabilities to the ensuing wave behavior near the critical level.

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