Geophysical Research Abstracts
Vol. 14, EGU2012-12554, 2012
EGU General Assembly 2012

Resonant Instability in Steady Mountain Waves with Realistic Background Conditions

K.C. Viner (1), C.C. Epifanio (2), and J.D. Doyle (1)

(1) Naval Research Laboratory, Monterey, CA, United States, (2) Texas A&M University, Dept. of Atmospheric Sciences, College Station, TX, United States

A Newton solver has been developed for both finding steady nonlinear mountain-wave solutions in a general 2D background flow and examining the stability of those solutions. Previous work has examined the stability of solutions for constant background flow over a single Gaussian ridge and revealed a resonant wave-wave instability which exists at subcritical mountain heights and increases in strength with increasing nonhydrostatic effects. The current work focuses on wave-wave instability at subcritical mountain heights for more realistic background conditions. Instability strength and spatial characteristics are examined given various profiles of shear and static stability. In this study, we will explore the hypothesis that sheared environments and sharp static stability gradients near the mountain crest will each serve to widen the spectrum of possible nonlinear interactions and increase the growth rates of the instability relative to cases with constant wind speed and static stability.