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Stratospheric effects on baroclinic instability in the Eady model

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The upper rigid lid of the conventional Eady model for baroclinic instability is replaced by a more realistic stratosphere with different buoyancy frequency and different shear. As a result, a basic state potential vorticity gradient of variable amplitude is generated at the tropopause.

In this talk we discuss the normal mode and nonmodal stability of a number of different stratospheres and put the traditional Eady model with rigid lid into perspective. As compared to the traditional Eady model with upper rigid lid the stability properties are modified significantly. A particular interesting feature is the appearance of a long-wave cutoff which does not exist in the Eady model with upper rigid lid.