MICHAEL WAITE, University of Victoria, PO Box 3060 Stn CSC, Victoria, BC, V8W 3R4
Investigating the atmospheric kinetic energy spectrum with numerical simulation

Numerical simulation provides a powerful tool in the effort to understand the atmospheric kinetic energy spectrum. Experiments typically fall in to one of two categories:

(1) idealized simulations of rotating stratified turbulence, usually with a pseudo-spectral integration of the Boussinesq equations; or

(2) simulations with a global or mesoscale atmospheric model, in which a range of physical effects (e.g., clouds, radiation) are represented in some fashion.

In this talk, we will present new high-resolution simulations of an atmospheric baroclinic wave, and discuss the implications for theories of the kinetic energy spectrum. Forcing from clouds, radiation, and topography are ignored as in (1), but a realistic atmospheric flow is employed as in (2). The tropospheric spectrum is steeper than observed through the mesoscale, although the horizontally divergent contribution has a realistic slope of around $-5/3$. These results raise questions about the applicability of turbulence cascade theories to the atmospheric spectrum.