



SATURATION AND DISSIPATION OF GRAVITY WAVES IN THE MIDDLE ATMOSPHERE

Hines,C.O.(1,2); Childress,L.I.(1); Kinney,J.B.(1); Sulzer,M.P.(1)

(1) Arecibo Observatory, Arecibo, Puerto Rico 00613 U.S.A.; (2) Laboratory for Atmospheres, NASA/GSFC, Greenbelt, MD 20771 U.S.A.

The gravity-wave spectral tail that is observed at large vertical wavenumbers in the middle atmosphere can be fully accounted for, from an Eulerian point of view, as a consequence of the Doppler-shift nonlinearity of the Eulerian governing equations. New computations based on this premise yield the observed tail intensity at a Lagrangian Richardson number of about 6, which may be expected to be accompanied by a large-scale Eulerian Richardson number of the order 1, consistent with marginal instability imposing an equilibrium state. Saturation of the tail spectrum at the inferred intensity is a direct consequence of the analysis. Parameterizations of the accompanying deposition of wave momentum, as driver of the circulation of the middle atmosphere, are discussed.