

Gravity Waves in Hot Planet Atmospheres with High Speed Flows

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Abstract

Many global hydrodynamics models have been used to study the large-scale flows of close-in extrasolar planet atmospheres. None of these models, however, resolve gravity waves which can significantly affect the large-scale flow and its associated variability in the atmosphere. Such waves are generated by a variety of mechanisms – including, *inter alia*, spatially or temporally varying diabatic heating, convective overshoots, hydrodynamic instabilities and adjustment processes. Previously, we have examined mesoscale gravity waves in an inviscid atmosphere with moderately fast background flows [1]. In this work, we study large-scale, as well as mesoscale, waves in atmospheres containing high-speed flows and regions of strong dissipation. The primary focus is on the waves’ propagation characteristics and interaction with the mean-flow.

References

[1] Watkins, C. and Cho, J. Y-K.: Gravity waves on hot extrasolar planets. I. propagation and interaction with the background, ApJ, Vol. 714, pp. 904-914, 2010.