

Friday March 5, 2010
10:30–11:30
1165 Etchevery Hall.

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Zonal Jet Formation in 3D stratified Turbulence with Applications to Jupiter

Abstract:

Planetary missions to Jupiter since the early 1970s have revealed that the cloud-top winds have three dynamic regimes. The equatorial region has a fast, broad eastward jet with no vortices. The mid-latitudes are marked by narrower zonal jets that alternate between eastward and westward, with many vortices embedded, championed by the Great Red Spot. The polar regions have no pronounced zonal flow and marked by countless vortices that range in size from several thousand kilometers to the limit of resolution. My talk will address some of the processes that control and maintain these dynamic regimes by examining the formation of zonal jets from random small-scale turbulence. I will first review the 2D studies that precede our work, and then present our results, which is, to the best of our knowledge, the first 3D modeling effort that addresses these issues. The study has been published as Sayanagi, Showman and Dowling (2008, J. Atmospheric Sci.).