Statistical Mechanics of a Geophysical Jet[1] EMILY CONOVER,
J.B. MARSTON, Brown University — We investigate the equal-time statistics of
an equatorial jet in a two-dimensional quasi-geostrophic model of a planetary atmo-
sphere on a rotating sphere[2]. Potential vorticity is advected by the barotropic flow
and at the same time relaxes towards the zonal shear flow of an underlying equatorial
jet. A transition to turbulence occurs at sufficiently slow relaxation rates. Statistics
accumulated by direct numerical simulation[3] are compared to those obtained by a
simple cumulant expansion. We study rigorous upper bounds on the instability size[4]
and discuss the limitations of the cumulant expansion.

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[3]Akio Arakawa, J. Comp. Phys. **1**, 119 (1966).
[4]T. G. Shepherd, J. Fluid. Mech. **196**, 291 (1988).

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