Dynamics group seminars 2012

In Sayre 312 from noon to 1pm (unless otherwise noted)

Thursday August 16, Elizabeth A. Barnes, Lamont-Doherty Earth Observatory

TITLE

Response of the midlatitude jets and of their variability to a poleward shift of the jet in the CMIP5 models

ABSTRACT

The eddy-driven jet is located in the midlatitudes, bounded on one side by the pole and often bounded on the opposite side by a strong Hadley-driven jet. This work explores how the eddy-driven jet and its variability exist within these limits and how the variability of the jet may respond to climate change using model output from the Coupled Model Intercomparison Project, Phase 5 (CMIP5).

We consider separately the North Atlantic, the North Pacific and the Southern Hemisphere jets and show that the variability of all three change as the jets migrate poleward with climate change. For the Southern Hemisphere and the North Atlantic jets, the variability becomes less of a north-south wobbling (i.e. an 'annular mode') and more of pulsing (i.e. an increase/decrease of the jet speed). In contrast, for the North Pacific jet, the variability becomes less of a pulsing and more of a north-south wobbling. The response of the jet variability in the CMIP5 models is similar to the response found in a stirred barotropic model on the sphere when the stirring latitude (i.e. storm track) is varied.

These results highlights how important it is for models to correctly position the jet, as slight deviations in latitude may cause large changes in tropospheric variability. In addition, this work stresses the importance of calculating future jet variability on a model-by-model and scenario-by-scenario basis, since the observed "annular mode" patterns of the 20th Century may not be the dominant form of jet variability in the future.