

ATS/CIRA Colloquium

Cameron Homeyer

Visiting from NCAR

Hosted by Thomas Birner

Thursday, March 14, 2013

**ATS room 101; Discussion will begin at 3:30pm
Refreshments will be served at 3:00pm in the weather lab**

Rossby wavebreaking is an important mechanism for the two-way exchange of air between the tropical upper troposphere and lower stratosphere and the extratropical lower stratosphere. We present a 30-year climatology (1981-2010) of anticyclonically and cyclonically sheared wavebreaking events along the boundary of the tropics in the 350-500 K potential temperature range from ECMWF ERA-Interim reanalyses. Lagrangian transport analyses show net equatorward transport from wavebreaking near 380 K and poleward transport at altitudes below and above the 370-390 K layer. The finding of poleward transport at lower levels is in disagreement with previous studies and is shown to largely depend on the choice of tropical boundary. In addition, three distinct modes of transport for anticyclonic wavebreaking events are found near the tropical tropopause (380 K): poleward, equatorward, and symmetric. These transport modes are associated with specific characteristics of the geometry of the mean flow. In particular, composite averages show that poleward transport is associated with a "split" subtropical jet where the jet on the upstream side of the breaking wave extends poleward and meridionally overlaps the equatorward subtropical jet downstream. Equatorward transport is not associated with a split subtropical jet and is found immediately downstream of stationary anticyclones in the tropics, often associated with monsoon circulations. It is further shown that, in general, the transport direction of breaking waves is determined by the geometry of the mean flow alone.

Link to colloquium videos and announcement page: <http://www.atmos.colostate.edu/dept/colloquia.php>