Geophysical Research Abstracts
Vol. 12, EGU2010-13803-1, 2010
EGU General Assembly 2010

Can the Increase in the Eddy Length Scale Under Global Warming Cause the Poleward Shift of the Jet Streams?

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There is a robust increase in the eddy length scale in the simulation of future climates. The question of whether this may cause the poleward shift of the mid-latitude jet streams is addressed.

An experiment with a barotropic model is presented where an increase in the length scale of a mid-latitude perturbation results in a poleward shift in the acceleration of the zonal flow. Initial investigations indicate that this behavior is also important in both observational data and the output of comprehensive general circulation models (GCMs). A simplified GCM is used to show that the latitude of the eddy-driven jet is well correlated with the eddy length scale. It is argued that the increase in the eddy length scale causes the poleward shift of the jet in these experiments, rather than vice-versa.