Atmospheric Rossby waves identification and tracking with ‘raytracing’

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old title

title: ‘raytracing: An R package for identification and tracking the atmospheric Rossby waves’

# Summary

Planetary or atmospheric Rossby waves have large influence on weather and climate around the world. Such influences can happen even far away from the wave sources, through wave patterns that connect the atmosphere in two different regions miles away from each other. An example of this comes from the El Niño Southern Oscillation (ENSO), in which the deep convection over the tropical Pacific ocean trigger disturbances in the atmosphere, leading to planetary waves that are able to travel towards the extratropics and affect the climate and weather there. Latent heat sources, such as those linked to ENSO, are not the only source for Rossby waves triggering (Hoskins and Karoly (1981); Ambrizzi and Hoskins (1997)). Detecting the triggering regions of these waves, their characteristics, where they pass and where they go is of uppermost importance for research, assignment, monitoring and forecasting of weather and climate. Therefore, the detection and tracking of atmospheric Rossby waves is of paramount importance for scientists, climatologists, meteorologists and students seeking for a better understanding of the dynamics of the atmosphere.

Ambrizzi, Tércio, and Brian J Hoskins. 1997. “Stationary Rossby-Wave Propagation in a Baroclinic Atmosphere.” *Quarterly Journal of the Royal Meteorological Society* 123 (540): 919–28.

Hoskins, Brian J, and David J Karoly. 1981. “The Steady Linear Response of a Spherical Atmosphere to Thermal and Orographic Forcing.” *Journal of the Atmospheric Sciences* 38 (6): 1179–96.