Geophysical Research Abstracts
Vol. 20, EGU2018-3997, 2018
EGU General Assembly 2018

Rossby Wave Propagation into the Northern Hemisphere Stratosphere: The Role of Zonal Phase Speed

Daniela Domeisen (1), Olivia Martius (2), and Bernat Jiménez-Esteve (1)

(1) ETH Zürich, Institute for Atmospheric and Climate Science, Zürich, Switzerland (daniela.domeisen@env.ethz.ch), (2) Institute of Geography, Oeschger Centre for Climate Change Research, University of Bern, Switzerland

Sudden Stratospheric Warming (SSW) events are to a dominant part induced by upward propagating planetary waves. While theory predicts that the zonal phase speed of a tropospheric wave forcing affects wave propagation into the stratosphere, its relevance for SSW events has so far not been considered. This study shows in a linear wave diagnostic and in reanalysis data that phase speeds tend eastward as waves propagate upwards, indicating that the stratosphere pre-selects eastward phase speeds for propagation, especially for zonal wave number 2. This effect is critical for SSW events: Split SSW events tend to be preceded by anomalously eastward zonal phase speeds. Zonal phase speed may indeed explain part of the increased wave flux observed during the preconditioning of SSW events, as e.g. for the record 2009 SSW event.