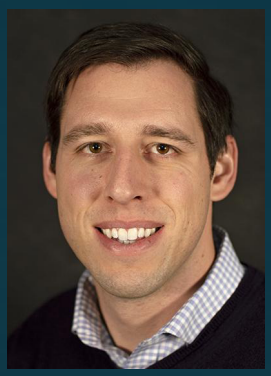
FSU Meteorology Seminar Series, Spring 2020



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Rossby wave breaking through the 21st century in a global climate model

Abstract

Rossby wave breaking (RWB) on the dynamic tropopause (DT) occurs when synoptic-scale Rossby waves become highly amplified and undergo a breaking process. This process can result in significant meridional transport of air masses resulting and intrusions of low latitude air poleward, high latitude air equatorward, or a combination of the two. The ensuing modification of the troposphere and lower stratosphere in response to such events have been areas of considerable research due to their potential impacts on both high- and low-frequency mid- and high-latitude variability. Furthermore, the potential impacts of future changes in these events make them of considerable interest for identifying and studying in global climate model (GCM) simulations.

This talk will explore the application of a DT-centric RWB identification scheme to the NCEP Reanalysis-2 dataset to explore the regional distributions of RWB in the late 20th century along with linkages between RWB and well-known teleconnection patterns. Next, RWB frequencies will be identified using three sets of 25-member Community Earth System Model (CESM) simulations with prescribed sea surface temperature and sea ice conditions over the historical period (2010-2019), mid-Century (2050-2059) and late-Century (2090-2099). This dataset represents a unique opportunity to study Rossby wave breaking processes in future climate simulations on a dynamically evolving surface rather than the more common pressure levels or isentropic levels as the DT is calculated for each of the CESM members. RWB frequencies modeled in the historical period are compared to the NCEP dataset to explore the ability of the CESM model in this configuration to reproduce these features accurately. Furthermore, the three CESM periods of interest are examined to determine changes to the locations of Rossby wave breaking as well as changes to the dynamic and thermodynamic characteristics of composited Northern Hemisphere tropospheric circulation.

Time: **Tuesday March 10, 3:30 PM**
Location: 1044 EOA