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Evaluation of the CLLJ, MJO, and easterly waves within the Intra-Americas Sea region for select AR5 models

Yolande Serra[†]; Kerrie Geil
[†] University of Arizona, USA
Leading author: serra@atmo.arizona.edu

Several studies point out the critical role that orography plays in present day mid-latitude and tropical storm tracks. Recent work also suggests that the Madden-Julian Oscillation (MJO) and Caribbean low-level jet (CLLJ) influence storm track activity within the IAS, including eastern N. Pacific and N. Atlantic tropical storm (TS) activity. Studies of tropical storm tracks using AR4 future climate scenarios find reduced storm track activity in the N. Atlantic and a shift of the eastern N. Pacific storm track southward. The intensity of tropical storms overall appears to remain unchanged in studies that have accounted for a mean shift in the tropical mean sea surface pressure due to warmer temperatures. However, storm intensity is more dependent on model resolution than storm frequency making these predictions more difficult. The overall objective of this study is to investigate impacts on the regional forcing mechanisms of synoptic waves and TSs in the IAS associated with the predicted southward shift in the tropical storm track. WRF-ARW will be used to dynamically downscale well performing AR5 models to achieve the goals of the study. Here, we present an evaluation of select AR5 models including the National Center for Atmospheric Research's CCSM 4.0 and the Hadley Centre's HadGEM2-ES against two reanalysis products, the National Aeronautics and Space Administration's Modern Era Retrospective-analysis for Research and Applications (MERRA) and the European Centre for Medium-Range Weather Forecast's ERA Interim reanalysis (ERAI). Analysis of these models' future storm track and TS activity will also be presented. These models are found to perform reasonably well for the current climate in terms of their ability to simulate the tropical storm track, CLLJ, and MJO in the IAS region and will be used for our future downscaling work.