

Model-based diagnostics of moisture variability in the North American monsoon

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We review the way in which AMIP models simulate observations of moisture divergence in the region of the North American monsoon, centered on Mexico and the southwest United States. We concentrate on analyses in the three nested tiers considered by the North American Monsoon Experiment (NAME). Models typically capture the springtime/early summer northward advance and late summer southward retreat of moisture divergence and precipitation, though a considerable inter-model spread exists in this signal. The use of certain land-surface schemes in models appears to be associated with particularly weak or strong monsoon signals. Interannual variations in the models' monsoon signature appear related to El Niño, though they differ considerably from this signal in the NCEP-NCAR Reanalysis, where the influence of lower frequency variations is stronger. Besides Reanalysis, additional datasets for precipitation are used to compare model-based moisture quantities. We consider the possible relationship of other large-scale atmospheric modes to the variability of moisture divergence over the NAME regions.