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Satellite infrared brightness temperatures provide detailed information about clouds and water vapor that make them very useful for model forecast verification and process-level studies. In this presentation, results will be shown from several studies that used all-sky infrared brightness temperatures to assess the accuracy of clouds and water vapor in high-resolution numerical weather prediction model forecasts. These studies have shown that the accuracy of the cloud and water vapor fields is very sensitive to the parameterization schemes. For example, replacing the Noah land surface model with Noah-MP led to stronger convection across the southeastern U.S. due to enhanced surface convergence between forested and grassland areas that was driven by changes in the surface latent and sensible heat fluxes. These studies have also shown that it is beneficial to employ a variety of verification methods ranging from traditional grid point metrics such as root mean square error to more sophisticated neighborhood and object-based methods to assess forecast accuracy because they provide complementary information.
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