

Study of MODIS Retrieved Total Precipitable Water Data and Their Impact on Weather Simulations

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Abstract

The assimilation of Moderate Resolution Imaging Spectrometer (MODIS) Total Precipitable Water (TPW) near Infra-Red (nIR) data into the WRF model simulations has been demonstrated for the case of a severe thunderstorm over the southern US in early June, 2004 and for the case of Hurricane Isidore, in September 2002 over the ocean. Preliminary results show that for the thunderstorm over the southern US, no impact is found for the simulated rainfall. A study of possible biases in the MODIS nIR data was carried out with comparisons with GPS precipitable water data and radiosonde data and a moist bias was found. After the correction of the MODIS data, an improvement in terms of reducing the amount of false simulated rainfall is clearly shown. For hurricane Isidore, the simulated storm intensity is improved. It is found that there is almost no impact for the first day of simulation after the assimilation of MODIS data because very few data are available due to cloudiness over the storm region and its vicinity. However, for the thunderstorm case over land, there is an impact on simulated rainfall during the first 18h after assimilating corrected data since data are available over the region of interest (i.e., not cloudy) at the initial time of the numerical simulation. Further studies of MODIS data quality and additional simulations are underway to confirm these preliminary results.