Current U.S. weekly/monthly drought monitoring data products use soil moisture simulations of several land surface models (LSMs) including the Noah LSM in the North America Land Data Assimilation System (NLDAS) as input. Accuracy of these simulations relies on the precision and representativeness of surface parameters and meteorological forcing data. Most of the surface parameters and model inputs implemented in the current NLDAS setting are static datasets generated from multi-year climatological averages. Real time satellite data products are becoming increasingly available from various satellite sensors, which are more representative of actual surface conditions, especially at shorter time scales. This study aims at analyzing the impact of the near-real-time (NRT) satellite observations of land surface parameters on the flux and soil moisture (SM) simulations using the Noah LSM. These near-real-time satellite datasets include the GOES Surface and Insolation Products (GSIP) hourly solar insolation, MODIS albedo and MODIS Green Vegetation Fraction (GVF; derived from LAI).

The analysis is carried out based on the Noah LSM (version 3.2) in the NASA Land Information System (LIS). GSIP real time insolation observations are used to replace the insolation forcing in NLDAS. MODIS NRT albedo and LAI, converted to GVF before insertion into the Noah LSM, are used to replace the static seasonal surface albedo and monthly green fraction datasets. To demonstrate the values of assimilating NRT satellite observations, surface fluxes (including sensible, latent and ground fluxes) and soil moisture (SM) simulations using the static climatological datasets and with real-time satellite observations are carried out with identical meteorological forcing data and are compared against in-situ measurements of the corresponding fluxes, surface and root zone SM. The NRT satellite observations of the surface parameters are found to have the potential to enhance the Noah LSM simulations and in turn to improve the drought monitoring products. This paper will present and discuss the benefits of the NRT satellite observations for drought monitoring using NLDAS simulations.