ABSTRACT

TITLE: Global Assessment of Land Surface Temperature From Geostationary Satellites and Model Estimates

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Land surface (or 'skin') temperature (LST) lies at the heart of the surface energy balance and is a key variable in weather and climate models. In this research we compare two global and independent data sets: (i) LST retrievals from five geostationary satellites generated at the NASA Langley Research Center (LaRC) and (ii) LST estimates from the quasi-operational NASA GEOS-5 global modeling and assimilation system. The objective is to thoroughly understand both data sets and their systematic differences in preparation for the assimilation of the LaRC LST retrievals into GEOS-5.

As expected, mean differences (MD) and root-mean-square differences (RMSD) between modeled and retrieved LST vary tremendously by region and time of day. Typical (absolute) MD values range from 1-3 K in Northern Hemisphere mid-latitude regions to near 10 K in regions where modeled clouds are unrealistic, for example in north-eastern Argentina, Uruguay, Paraguay, and southern Brazil. Typically, model estimates of LST are higher than satellite retrievals during the night and lower during the day. RMSD values range from 1-3 K during the night to 2-5 K during the day, but are larger over the 50-120 W longitude band where the LST retrievals are derived from the FY2E platform.