The land surface skin temperature is central to the surface energy, water, and radiation balances. In an atmospheric model, improved skin temperature estimates are expected to yield improved temperature and humidity profiles, while in an atmospheric data assimilation system improved skin temperature states are ultimately expected to enhance the assimilation of atmospheric radiances from surface-sensitive channels. Near-instantaneous skin temperature estimates can be retrieved from geostationary Earth orbiting satellite observations with high temporal frequency (potentially sub-hourly) and extensive spatial coverage (all clear-sky low and mid-latitudes). Using a constellation of five geostationary satellites, NASA Langley are generating 3-hourly skin temperature observations at 0.3125x0.25 degrees, with an estimated error over land of less than 2K. These skin temperature observations are assimilated into the Goddard Earth Observing System Model, version 5 (GEOS-5) every 6 hours over North America, using an ensemble Kalman filter-based Land Data Assimilation System (LDAS). The LDAS has been coupled to GEOS-5 in that it receives atmospheric forcing from GEOS-5, and returns incremental land surface analysis updates to GEOS-5. A dynamic observation bias correction scheme has been implemented within the LDAS to remove the biases in the geostationary skin temperature observations. The impact of the assimilation is evaluated by examining the impact on forecasts of skin temperature, land surface fluxes, and low-level temperature and humidity.