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Abstract: Diurnal Cycle of Land Surface Temperature under All Sky Conditions

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Land surface temperature (LST) is a key parameter in the initialization of climate models, many environmental studies and in applications related to water resources management over agricultural sites. LST is routinely retrieved from remote sensing through thermal infrared channels on-board the polar and geostationary meteorological satellites. But such retrievals are limited to clear-sky conditions. In the present work, we make use of a companion study which estimates the net surface solar radiation (NSSR) or surface solar absorption under all-sky conditions from remote sensing of geostationary visible channel data to deduce a simple relationship between the diurnal evolution of NSSR and LST. This approach has been demonstrated by combining with a two-channel LST retrieval scheme using the gridded GOES-12 data available at National Center for Environmental Information (NCEI) for year 2007 merged with the Moderate Resolution Imaging Spectroradiometer (MODIS) data, over the contiguous United States region. Validation of diurnal LST is performed employing in-situ measurements over all of the NOAA Surface Radiation Measurement Network (SURFRAD) sites.