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MEaSUREs Land Surface Temperature from GOES Satellites

Rachel T. Pinker (1), Wen Chen (1), Yingtao Ma (1), Tanvirr Islam (2), Eva Borbas (3), Chris Hain (4), Glynn Hulley (2), Kerry-Anne Cawse-Nicholson (2), Simon Hook (2), and Jeff Basara (5)

(1) University of Maryland, Dept. of Atmospheric and Oceanic Science, College Park, MD 20742, United States (pinker@atmos.umd.edu), (2) NASA Jet Propulsion Laboratory, Pasadena, CA, (3) University of Wisconsin–Madison, Space Science and Engineering Center (SSEC)/(CIMSS), (4) NASA Marshall Space Flight Center, Huntsville, ALA, (5) School of Meteorology, the University of Oklahoma, Norman, OK

Information on Land Surface Temperature (LST) can be generated from observations made from satellites in low Earth orbit (LEO) such as MODIS and ASTER and by sensors in geostationary Earth orbit (GEO) such as GOES. Under a project titled: “A Unified and Coherent Land Surface Temperature and Emissivity Earth System Data Record for Earth Science” led by Jet Propulsion Laboratory, an effort is underway to develop long term consistent information from both such systems. After mid-2003 till 2017 only one thermal channel is available on the GOES satellites. To generate a long term record of consistent GOES based information on LST, it is necessary to use retrievals from a single channel. This requires generation of consistently calibrated GOES observations, identification of clear sky radiances, and development of retrieval algorithms. Results to be discussed are based on retrievals of LST using a RTTOV radiative transfer approach adjusted for the GEO characteristics, to be consistent with JPL approach to generate the MOD21 product. It is driven with the CAMEL (Combined ASTER-MODIS Emissivity over Land) product from the University of Wisconsin Global Infrared Land Surface Emissivity (UWIREMIS) and the ASTER Global Emissivity (GED) Database and MERRA-2 reanalysis fields for water vapor. Evaluation from six years of LST information at 0.05o resolution derived from observations from GOES-E and GOES-W against MOD11, the BSRN/SURFRAD network, the DOE Atmospheric Radiation Measurement (ARM) site at the Southern Great Plains central facility, and from the Oklahoma MESONET will be presented.