

Status of the Land Surface Temperature Product Development for JPSS Mission

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Abstract:

Land Surface Temperature (LST), a critical parameter for the study of the earth surface energy flux and water balance, has been listed as one of the Essential Climate Variables (ECVs) by the Global Climate Observation System of the World Meteorological Organization. Remotely sensed LST from GEO and LEO satellite missions provides regional and global LST measurements at various spatial and temporal resolutions. JPSS provides LST measurements as an Environmental Data Record (EDR) for each swath observation along the orbit at 750 m spatial resolution at nadir. Our current focus is on the development of the enterprise LST algorithm, which will be used to produce consistent LST product for the JPSS satellite series.

This presentation introduces the enterprise LST algorithm design, development, quality evaluation, and implementation status. The preliminary evaluation has been conducted through the comparison of the enterprise VIIRS LST with ground observations from international flux network e.g. SURFace RADiation budget observing network (SURFRAD), Atmospheric Radiation Measurement (ARM), Baseline Surface Radiation Network (BSRN), and with other existing satellite LST products e.g. AQUA LST, SEVIRI LST. Generally a good agreement between the ground measurements and the JPSS LST is achieved with a precision from 1.2 K to 2.4 K among different sites. Better consistency is observed from the cross satellite comparison using the same retrieval algorithm. However, some issues and challenges need to be addressed in the validation efforts e.g. ground and satellite data quality control, station heterogeneity, sensor difference, viewing geometry impact, etc. Validation protocols development will further facilitate the enterprise solution.

Besides, we also worked on the gridded VIIRS LST development based on the level 2 granule LST. It is a daily global product providing two spatial resolutions at 0.009 degree and 0.036 degree. The gridded LST is being tested locally and expected to be available in the future.

Keywords: LST, JPSS, Enterprise algorithm, Split window technique, Gridded LST