VIIRS Sea Surface Temperature (SST) EDR Release, Provisional Data Quality
February 20, 2014
Read-me for Data Users

The Joint Polar Satellite System (JPSS) Algorithm Engineering Review Board released the VIIRS Sea Surface Temperature (SST) Environmental Data Record (EDR) to the public with a Provisional level maturity on 20 February 2014 (Mx8.2). Provisional quality is defined as:

- Product quality may not be optimal
- Incremental product improvements are still occurring
- Version control is in effect
- General research community is encouraged to participate in the QA and validation of the product, but need to be aware that product validation and QA are ongoing
- Users are urged to consult the EDR product status document prior to use of the data in publications
- May be replaced in the archive when the validated product becomes available
- Ready for operational evaluation

The Board recommends that users be informed of the following product information and characteristics when evaluating the VIIRS SST EDR:

- The format of the SST EDR has changed.
  - The previous version (before 20 February 2014) reported two SSTs – bulk and skin, where bulk SST was simply "Skin SST + 0.17K". In the new version, the bulk SST was replaced by the first-guess SST at each pixel location.
  - A separate "bulk-skin offset" field was added. This is a scalar set to 0.17K. Users in need of bulk SST can calculate it by simply adding it to the skin SST.
  - The bulk-related quality flags (QFs) were made spare.
- The SST regression equations were changed to match those used in EUMETSAT Ocean and Sea Ice Satellite Application Facility (OSI-SAF; Petrenko, B., A. Ignatov, Y. Kihai, J. Stroup, P. Dash, 2014: Evaluation and selection of SST regression algorithms for JPSS VIIRS. *JGR, submitted* www.star.nesdis.noaa.gov/sod/osb/sst/ignatov/peer/PetrenkoEtAl-JGR-2014.pdf).
  - The updated equations and regression coefficients include more elaborate dependencies on satellite zenith angle resulting in improved SST performance across the full VIIRS swath. The strong "limb cooling" at the swath edges that was evident previously is now significantly reduced or eliminated.
  - The moisture stratification logic used previously in the SST algorithm has been removed, in favor of improved treatment of view zenith angle dependencies.
- Further improvements to the SST performance are expected when the NOAA Optimum Interpolation 0.25° Daily SST Analysis (aka, "daily Reynolds") data becomes a daily-ingested Official Dynamic Ancillary Data (ODAD) source, and input to the SST algorithm. The current analysis SST data used in the real-time IDPS processing comes

from NCEP Global Forecast System (GFS), a previous reincarnation of the Reynolds SST product, which has a coarser resolution in both time (weekly) and space (0.5°) than the daily 0.25° Reynolds product. Work to bring the daily Reynolds data into IDPS is currently on-going (see CCR 474-CCR-14-1480).

- SST Quality Flags have not been revisited yet and remain highly suboptimal. We recommend against using them, at this time. We recommend using all ocean pixels identified by the VIIRS cloud mask (VCM) as confidently clear.

- Please note that VCM performance at night has fewer cloud leakages and is more appropriate for SST analyses. Daytime VCM has also improved but still remains highly suboptimal and greater caution is advised in using daytime SST data.

- For more details, please check the presentation "SST Status and Users Readiness" by Ignatov at www.star.nesdis.noaa.gov/star/meeting_SNPPEDR2014_agenda.php.

Please note that based on 2+ years of monitoring and cross-evaluation of IDPS SSTs in NOAA SST Quality Monitor (SQUAM; www.star.nesdis.noaa.gov/sod/sst/squam/), alongside with the NOAA heritage Advanced Clear-Sky Processor for Oceans (ACSPO) SST product, and the fact that all NOAA users expressed interest in ACSPO SST, and no users expressed interest in the IDPS EDR, the Review Board at the Provisional Review held from 7-8 January 2014 recommended "to stop IDPS algorithm work and focus on ACSPO". In February 2014, NOAA NPP Data Exploitation (NDE) Project endorsed operational production of ACSPO SST product to commence in March 2014.

The next steps in the VIIRS SST production and validation include

- operational implementation of ACSPO product in NDE system
- its archival at PO.DAAC http://podaac.jpl.nasa.gov/
- moving ACSPO SST to validation stage 1 maturity
- discontinuing production of the IDPS SST product and its archival at CLASS
- back-filling ACSPO SST product back to 20 January 2012
- disabling the prior archives of IDPS SST product

The IDPS VIIRS SST algorithm theoretical basis document (ATBD) Rev A is soon to be released (expected May 2014) and will be available at http://www.star.nesdis.noaa.gov/jpss/ATBD.php.

Information about ACSPO product is available at ftp://www.star.nesdis.noaa.gov/pub/sod/osb/aignatov/ACSPO/

Web-based analysis of the ACSPO and IDPS SST EDR products—along with other community SST products—can be found at the SQUAM website www.star.nesdis.noaa.gov/sod/sst/squam/

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