ACSPO (Advanced Clear-Sky Processor for Ocean) – SST Enterprise Algorithm

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NOAA STAR

JPSS SST

- NOAA Heritage ACSPO SST
  - Implemented in NDE in Mar 2014
  - Produces L2P (27 GB/day) and L3U (<1 GB/day) VIIRS SST products: 10min granules, in GHRSST Data Specification v2 (GDS2) format
  - To satisfy wide range of NOAA, national, and international SST users

- Team members
  - Sasha Ignatov – Lead; B. Petrenko; X. Zhou; Y. Kihai; I. Gladkova; K. He; Y. Ding; F. Xu; (J. Stroup; P. Dash; X. Liang)

- Current Users
  - STAR geo-polar blended Team (E. Maturi): L4 analysis
  - Coral Reef Watch Team (M. Eakin): Coral Reef Analyses
  - Canadian Met Centre Team (B. Brasnett/D. Surcel-Colan): L4 analysis
  - UK Met Office OSTIA Team (E. Fiedler/S. Good): L4 analysis
  - Australian Bureau of Meteorology (H. Beggs): L4 analysis, L3 products
  - STAR/NOS Chesapeake Bay (C. Brown): Chesapeake Bay monitoring
  - Several other users working to use including NCEP

Current Operational Product

- Current NDE algorithm - High level process flow
  - Preprocess: aggregate SDRs into 10min granules, destripe BTs, and re-sample (to fill in bow-tie deletions, and fix bow-tie distortions)
  - Generate L2P SST product: Calculate SST in each ocean pixels (up to 10km inland); Calculate single-scanner error statistics (SSES = estimate of SST bias and STD errors) and append to each retrieval; Identify high-quality SST pixels and append “SST mask”; append ancillary information; output: 10min granules in GHRSST format
  - Generate L3U (U=uncollated) SST product: Grid L2P into 0.02º, output 10min granules in GHRSST format
  - Archive: Both L2P and L3U are archived in PO.DAAC and eventually at NCEI (GHRSST venue)

- In addition to VIIRS, ACSPO SST products are produced from
  - Polar: AVHRR GAC (NOAA and Metop); AVHRR FRAC (Metop)
  - Polar: Experimental products from Terra and Aqua MODIS
  - Geo: AHI (Himawari-8/9); To be produced from ABI (GOES-R)

Lessons Learned

- Implementation of ACSPO in NDE system
  - Was easier and more straightforward than IDPS (reduced bureaucracy, easier/informal communication)
  - Code upgrades is relatively straightforward: deliver DAP to NDE/OSPO, help them implement & test
  - The NDE system: Not fully stable & Does not fully control its output (occasional data gaps)

- Interdependency with other products
  - In terms of other JPSS products: ACSPO is fully stand-alone processor (no need for cloud mask, aerosol, etc)
  - We only use first guess fields (SST and GFS), in conjunction with CRTM

Path Forward

- Anticipated developments
  - Reconcile geo and polar ACSPO codes
  - Improve SST imagery (fixed bow tie deletions and distortions)
  - Use pattern recognition for improved clear-sky mask and ocean fronts detection

- Upcoming Deliveries/Reviews
  - Currently, ACSPO v2.40 is operational
  - V2.41: polar/geo consistency, many other fixes/improvements/optimization
  - V2.50: fixes to bow-tie deletions and distortions
  - V2.60: use improved SST imagery for SST patterns (for improved cloud masking, and for ocean fronts detection)

- Risks
  - NDE resources maybe insufficient to process all EDRs, and lack redundancy (e.g. catch-up data outages)
  - What do we do with the J1 vs. S-NPP? Should process both? Do we have enough horsepower in NDE?
  - “Master list” of L1b outages does not exist (files not created, incomplete, reason)
  - NDE QC/monitoring of L2 data suboptimal. (users pointed out that data files are broken/incomplete)

Outstanding Issues

- Improve NDE HW and stability (before transitioning all EDRs into NDE)
- Create master list of missing/incomplete L1b's
- Improve output product QC and monitoring, before archival
- Ensure sufficient S-NPP/J1 redundancy (before J1 launch)
- Need reprocessing infrastructure in STAR
  - All RDRs should be available on spinning disk (SCDR)
  - SDR team to support latest and greatest RDR2SDR code
  - SDR team to support the RDR2SDR code for EDR reprocessing