

Polar SST Products and Monitoring at NOAA

Sasha Ignatov and John Sapper

ACSPO: Yury Kihai, John Stroup, Boris Petrenko, Xingming Liang, Xinjia Zhou

SQUAM: Prasanjit Dash

MICROS: Xingming Liang, Korak Saha

iQuam: Feng Xu, Prasanjit Dash

SST Algorithms and Quality Flags: Boris Petrenko

Destriping: Marouan Bouali

Focus of this Brief

ACSPO - Advanced Clear-Sky Processor for Oceans

- ✓ Operational: Experimental MODIS, VIIRS; Operational Metop-B
- ✓ ACSPO – RAN (Reanalysis) kicked off in 2013

VIIRS – NOAA responsible for JPSS products, Algorithms, Cal/Val

- ✓ Two SST products: IDPS and ACSPO – working to consolidate
- ✓ SST Algorithm and Quality Flags fixes
- ✓ VIIRS sensor checks: MICROS and Destriping

MICROS - Monitoring IR Clear-sky Radiances over Oceans for SST

www.star.nesdis.noaa.gov/sod/sst/micros/

- ✓ Monitor VIIRS for Stability and Consistency with MODIS/AVHRR
- ✓ Add Metop-B (Sep'12) and check for stability and consistency

SQUAM - SST Quality Monitor www.star.nesdis.noaa.gov/sod/sst/squam/

- ✓ Monitor/VAL IDPS, ACSPO and Metop-B SSTs

iQuam - In situ Quality Monitor www.star.nesdis.noaa.gov/sod/sst/iquam/

- ✓ Version 2 underway – ARGO floats, fuller temporal coverage

Advanced Clear Sky Processor for Oceans (ACSPO)

Project Goal

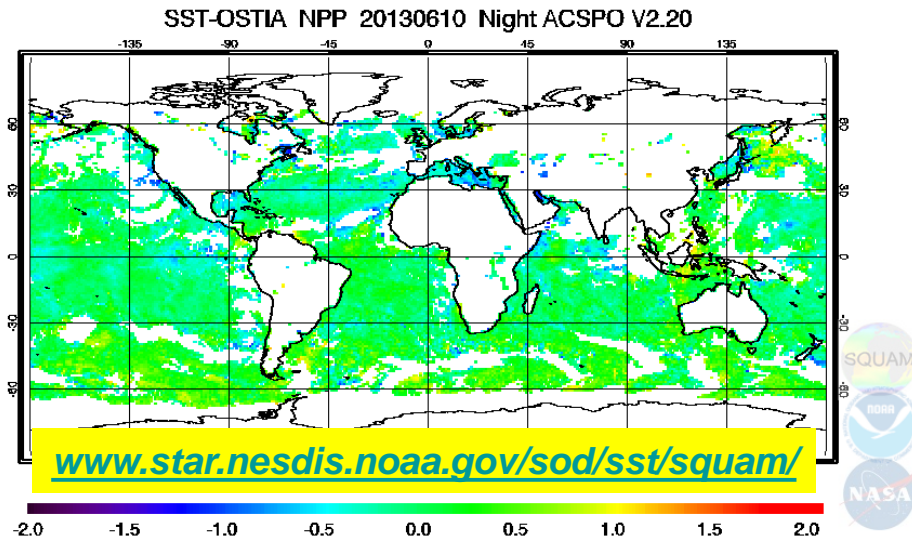
1. NOAA SST Retrieval System

- Use CRTM in conjunction with 1st guess SST and profiles
- Consistency between Operations and Reanalysis
- Consistent processing of Polar and Geo SST (for GOES-R)

Current Status

1. ACSPO v2.10 experimental Jan'12: S-NPP VIIRS, Terra/Aqua MODIS, ACSPO-RAN
2. ACSPO 2.20 operational May'13 with AVHRR GAC and FRAC (NOAA-18, -19, Metop-A , -B)

ACSPO VIIRS minus OSTIA SST @10 Jun 2013



Looking Forward

1. ACSPO v2.30 operational with VIIRS and AVHRRs Oct'13 GDS2 compliant
2. Tweaking for Reanalysis (FY13: 2004-pr, FY14: 1994-pr)
3. Tweaking for MSG SEVIRI, to get ready for GOES-R (2015)

Ignatov, and Team, NOAA

S-NPP VIIRS SST Products at NOAA

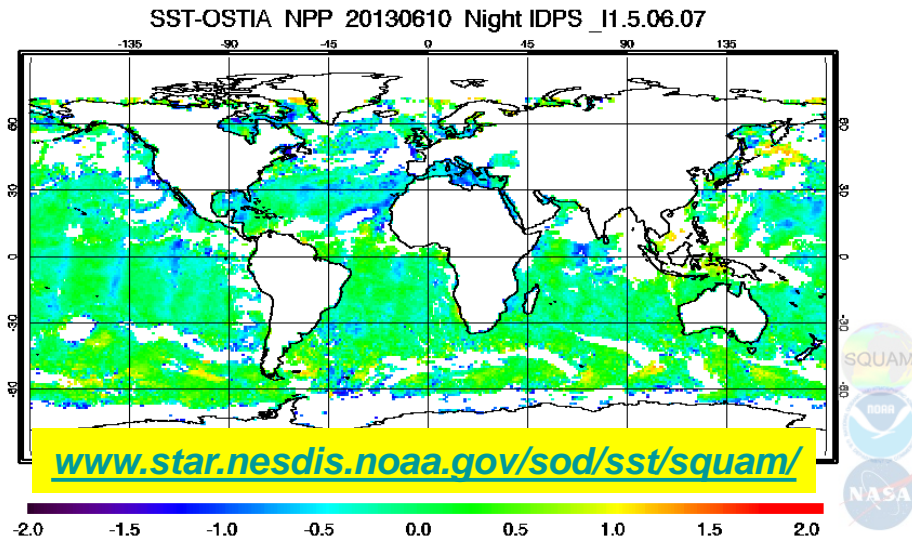
Project Goal

1. Generate L2 VIIRS SST product
 - NOAA responsible for JPSS data products, Algorithms, Cal/Val
 - Objective: Meet needs of NOAA, national and international users
 - Use community consensus SST Algorithms, QFs, destriping

Current Status

1. Interface Data Processing Segment (IDPS) SST declared beta Feb'13. Data Jan'12-pr available in CLASS. Quality non-uniform and suboptimal
2. Experimental ACSPO VIIRS SST generated at STAR
3. Alg (JGR) and destriping (JTECH) papers in review

IDPS VIIRS minus OSTIA SST @10 Jun 2013



Looking Forward

1. ACSPO and IDPS: Consolidate into one NOAA VIIRS SST product
2. ACSPO VIIRS: Operational in Oct'13 in GDS2 format (eventually, destriped)
3. Will use community consensus SST regression algorithms and QFs

Ignatov, and Team, NOAA

Monitoring IR Clear-sky Radiances over Oceans for SST (MICROS) and Destriping Analyses

Project Goal

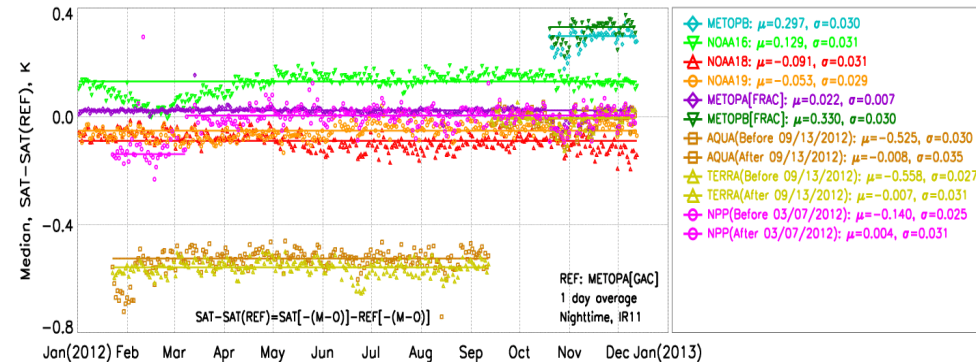
1. Monitor sensor radiances against RTM for stability and consistency to support three groups of users
 - SST applications
 - Satellite sensors inter-calibration
 - VAL RTM and input fields

2. Check for striping and mitigate

Current Status

1. Monitor VIIRS & Metop-B for stability & consistency w/5AVHRR+2MODIS - JGR paper in press
2. VIIRS very stable & in family. MODIS Bands 31 & 32 out-of-family resolved, Metop-B work in Progress

Double Differences from MICROS system @11 μ m



<http://www.star.nesdis.noaa.gov/sod/sst/micros/>

Looking Forward

1. Bring Metop-B back in family
2. Enable monitoring of VIS bands
3. Add ATSR & SLSTR
4. Add MSG SEVIRI, get ready for GOES-R (2015)

Liang and Ignatov, NOAA

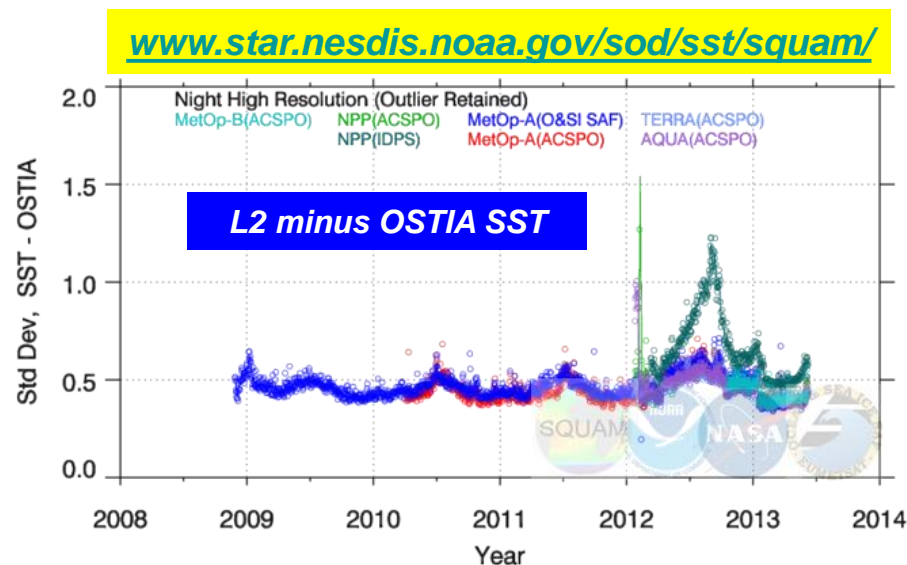
SST Quality Monitor (SQUAM)

Project Goal

1. Monitor community L2/3/4 SST products online in near-real time
 - Check for self- & cross-consistency
 - Validate vs. iQuam in situ SST
 - Facilitate products diagnostics & improvement

Current Status

1. L2: ACSPO (AVHRR – NOAA-16, 18, -19, Metop-A,-B; VIIRS – SNPP; MODIS Terra, Aqua), OSI SAF, SEATEMP
2. L3: Pathfinder v5.0
3. L4: GMPE, CMC, NAVO K10, JPL G1SST & MUR, Reynolds, RTG, OSTIA, GAMSSA, ODYSSEA, etc



Looking Forward

1. Add remaining L2 (MO(Y)D28, (A)ATSR, GEO) and L4
2. Add ACSPO-RAN
3. Add new functionalities: Monthly stats, scattergrams

Dash and Ignatov, NOAA

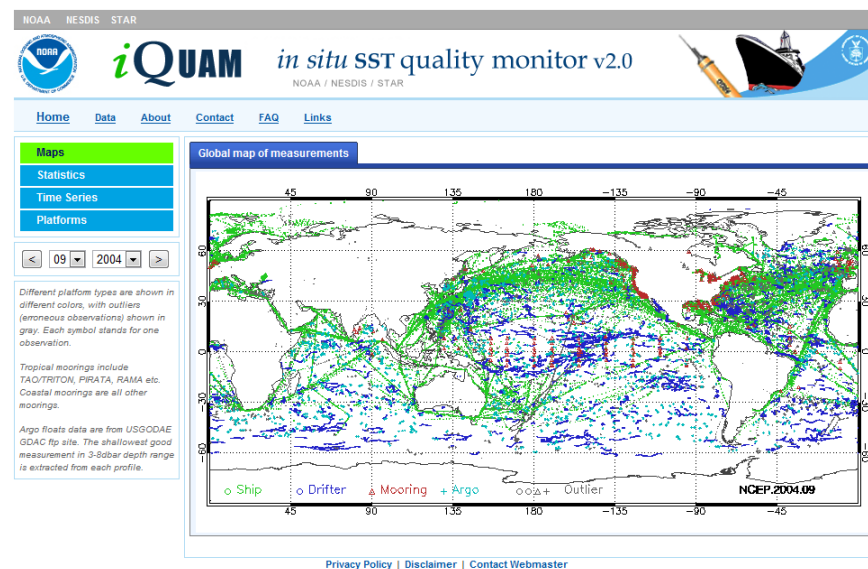
In situ SST Quality Monitor (*iQuam*)

Project Goal

1. Generate & Maintain global near-real time community consensus *in situ* SSTs for satellite Cal/Val
 - Perform uniform & accurate QC
 - Monitor on the web
 - Serve QCed data to users

Current Status

1. *iQuam* v1 sustained operations
www.star.nesdis.noaa.gov/sod/sst/iquam
2. Manuscript submitted to JTECH
3. *iQuam* SSTs used in SQUAM
www.star.nesdis.noaa.gov/sod/sst/squam/



Looking Forward

1. *iQuam* v2 development underway
 - Add ARGO Floats (Fig. above)
 - Add OSI SAF & UKMO black lists
 - Extend back to 1980
 - Regenerate based on ICOADS

Xu and Ignatov, NOAA

GDS2.0 Implementation and Issues

● **ACSPO v2.30 under development – GDS2 compliant**

- Target delivery date: October 2013
- ACSPO VIIRS SST will go operational at NOAA in Oct 2013
- All operational ACSPO AVHRR SST products will also switch to GDS2 around same time
- ACSPO-RAN products will be produced in GDS2 format, too

● **Issues and Topics for Discussion**

- GDS2: 4 questions sent into Ed Armstrong on 4/23/2013
- GDS2: Desire more flexibility with optional attributes layers
- GDS2: Integer view zenith angle – community consensus?
- VIIRS break-out Mon 17 Jun @4pm: Community Consensus
 - SST regression algorithms?
 - SST QFs and use in conjunction with SSES?

Later this week...

- VIIRS break-out: Mon 17 Jun @4pm
 - Community Consensus VIIRS Regression SST algorithms
 - Community Consensus QFs for VIIRS
- EARWIG Tue 18 Jun @8am
 - Marouan Bouali: Destriping MODIS/VIIRS
 - Irina Gladkova (presented by Boris Petrenko): Cloud detection based on pattern recognition
 - Korak Saha: Quantifying residual/ambient cloud
- STVAL Tue 18 Jun @10am
 - Sasha Ignatov: iQuam version 2
 - Prasanjit Dash: SQUAM
- AUSTAG, Tue 18 Jun @4pm
 - Prasanjit Dash: SQUAM Demo