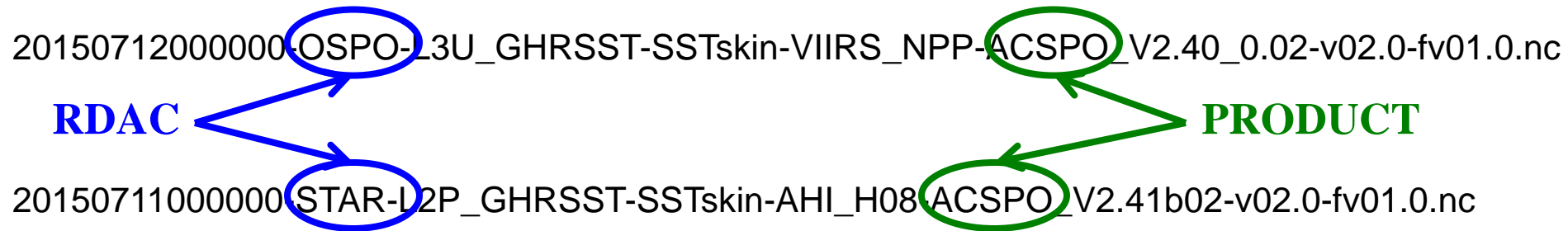# ACSPO SST Products
at NOAA STAR and OSPO

Alexander Ignatov (NOAA STAR)
John Sapper (NOAA OSPO)

John Stroup, Yury Kihai, <u>Boris Petrenko</u>, <u>Prasanjit Dash</u>,
<u>Irina Gladkova</u>, Maxim Kramar, <u>Xinjia Zhou</u>, Xingming Liang,
Yaoxian Huang, Yanni Ding, Feng Xu, Marouan Bouali, Karlis Mikelsons

NOAA; CIRA; GST Inc; CUNY

NOAA Regional Data Assembly Centers & Product

20150712000000-**OSPO**-L3U_GHRSST-SSTskin-VIIRS_NPP-**ACSPO**_V2.40_0.02-v02.0-fv01.0.nc

RDAC   **PRODUCT**

20150711000000-**STAR**-L2P_GHRSST-SSTskin-AHI_H08-**ACSPO**_V2.41b02-v02.0-fv01.0.nc

- **OSPO = NOAA Office of Satellite and Product Operations**
  - Operational arm of NESDIS (24/7)
  - Operational Products

- **STAR = NOAA Center for Satellite Applications and Research**
  - Research arm of NESDIS
  - Reprocessed and Experimental Products

- **ACSPO = Advanced Clear-Sky Processor for Oceans**
  - NOAA line of SST Products from Polar and GEO platforms
  - Operational ("OPS"), Reprocessed ("RAN"), and Experimental ("EXP")

NOAA ACSPO SST Products
(OPS=Operations; RAN=Reanalysis; EXP=Experimental)

- **S-NPP VIIRS (GDS2)**
  - OPS (L2P/L3U): OSPO/GDS2. Archived w/GHRSST (PO.DAAC/NODC)
  - RAN1 (L2P/L3U): Plan to produce/archive w/GHRSST Jan 2012 - pr

- **NOAA/MetOp AVHRRs (plan transition to GDS2)**
  - OPS/L2P: OSPO/hdf4 (N18/19, Metop-A). Plan to switch to GDS2 & archive w/GHRSST
  - OPS/L3U: Plan to start producing & archive w/GHRSST
  - RAN1 L2P/L3U: Plan to archive with GHRSST 2002-pr (two AM platforms – N17/Metop-A, and three PM platforms – N16/18/19)

- **Himawari-8 AHI (OPS and archival w/GHRSST: TBD)**
  - EXP: Produce L2P STAR/GDS2 (Jun 2015-on)
  - EXP: Plan to produce STAR/GDS2 L3 in 2015

- **GOES-R ABI (OPS and archival w/GHRSST: TBD)**
  - Plan launch in March 2016. Support Cal/Val and EXP products in STAR

S-NPP VIIRS

- **Two ACSPO versions implemented (v.2.31/2.40) / Archived w/GHRSST**
  - Warm low stratus cloud leakages fixed
  - New SSES generated (Boris Petrenko' presentation on 22 July @8:50am)
  - 0.02° L3U produced (10min granules similar to L2P, but factor ~30 smaller in size)
  - Destriping operationally performed

- **ACSPO VIIRS RAN1 (w/v2.40) underway**
  - Processing chain set up (Produce 10min granules; Destripe; Produce L2/L3; Match-up w/*i*Quam *in situ* and several L4 SSTs, Process in SQUAM/MICROS and display on the web; Archive w/GHRSST) – Currently under testing

- **Coming Year: ACSPO v2.50/2.60 (see poster by Irina Gladkova)**
  - Work with ACSPO users (L4 producers) on evaluation of L3U and SSES
  - Improve SST imagery
  - Implement algorithms for (1) pattern recognition; and (2) suppression of Gaussian noise
  - Generate new "SST fronts" product (can be used to validate SST gradients in L4 analyses)
  - Improve ACSPO Clear-Sky Mask (focus on Dynamic areas / Coastal zones / High latitudes)

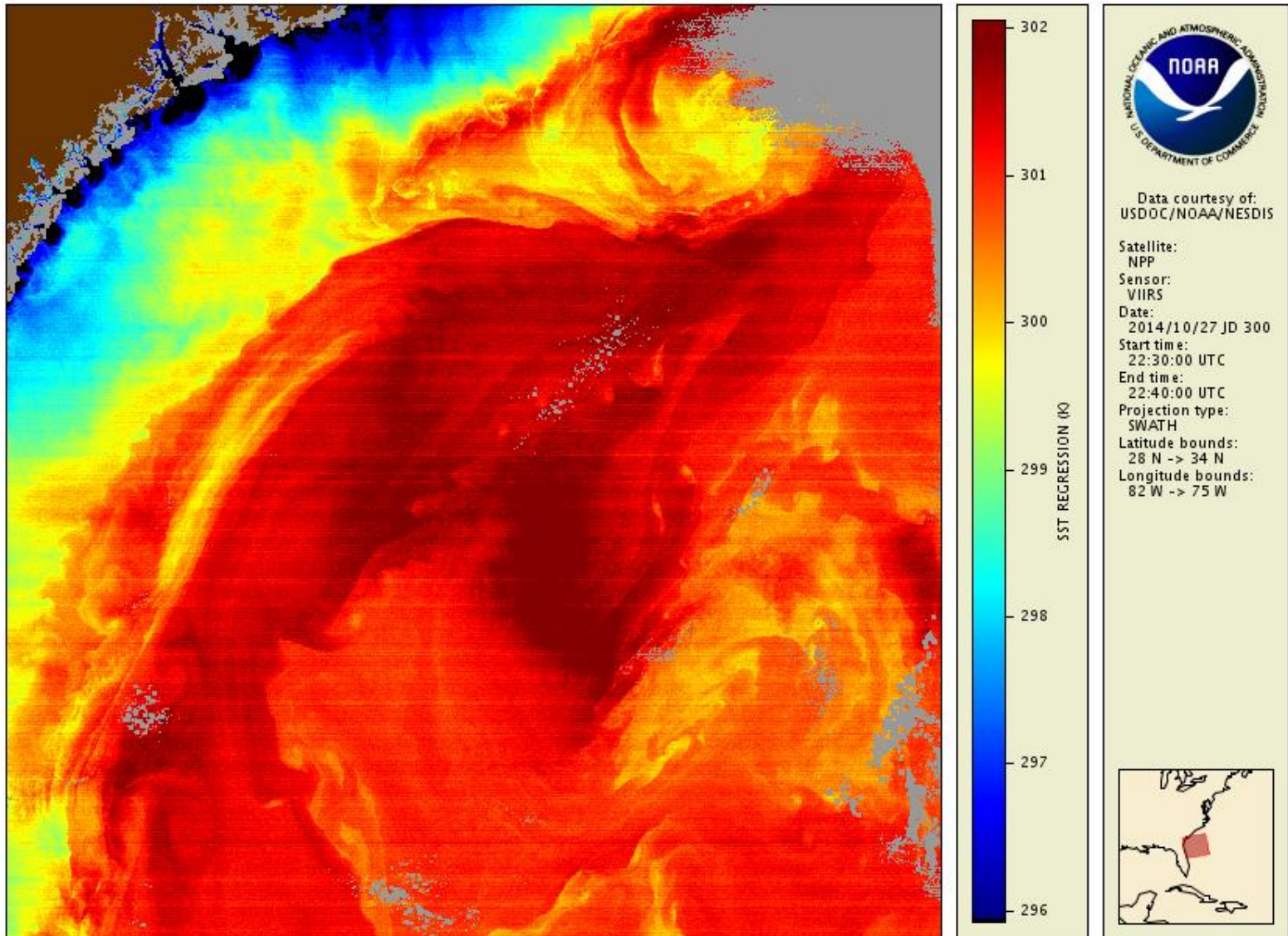# VIIRS L2P Validation – Standard Deviation
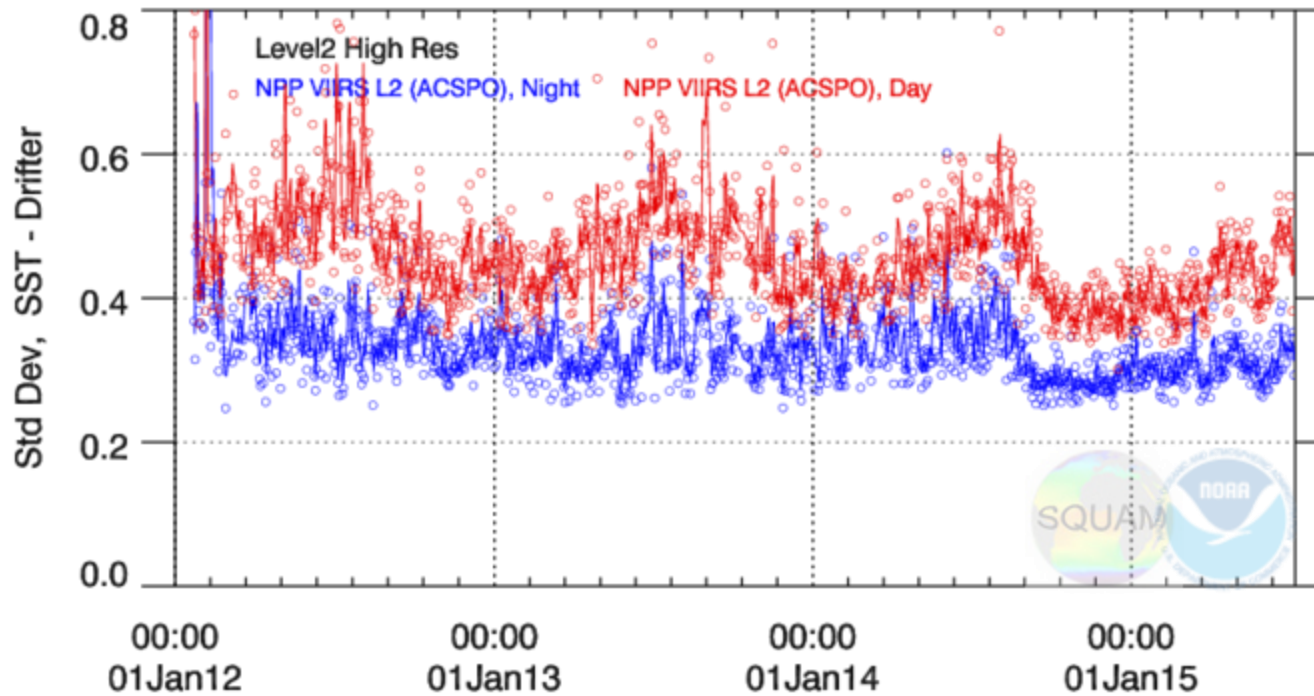
- Fix to warm low-stratus cloud leakages made time series tighter

- Nighttime STD: ~0.35 K; Daytime: ~0.45K

VIIRS L3U Validation – Standard Deviation
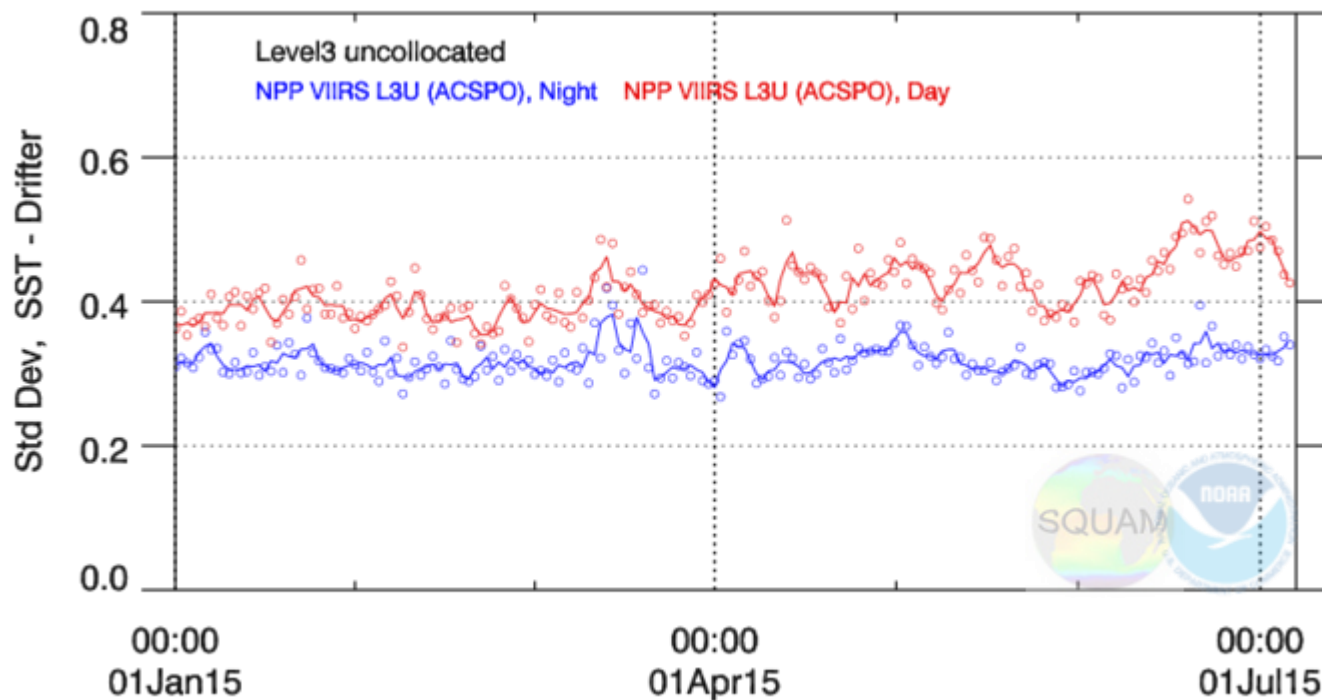
- Comparable to L2P Validation Statistics

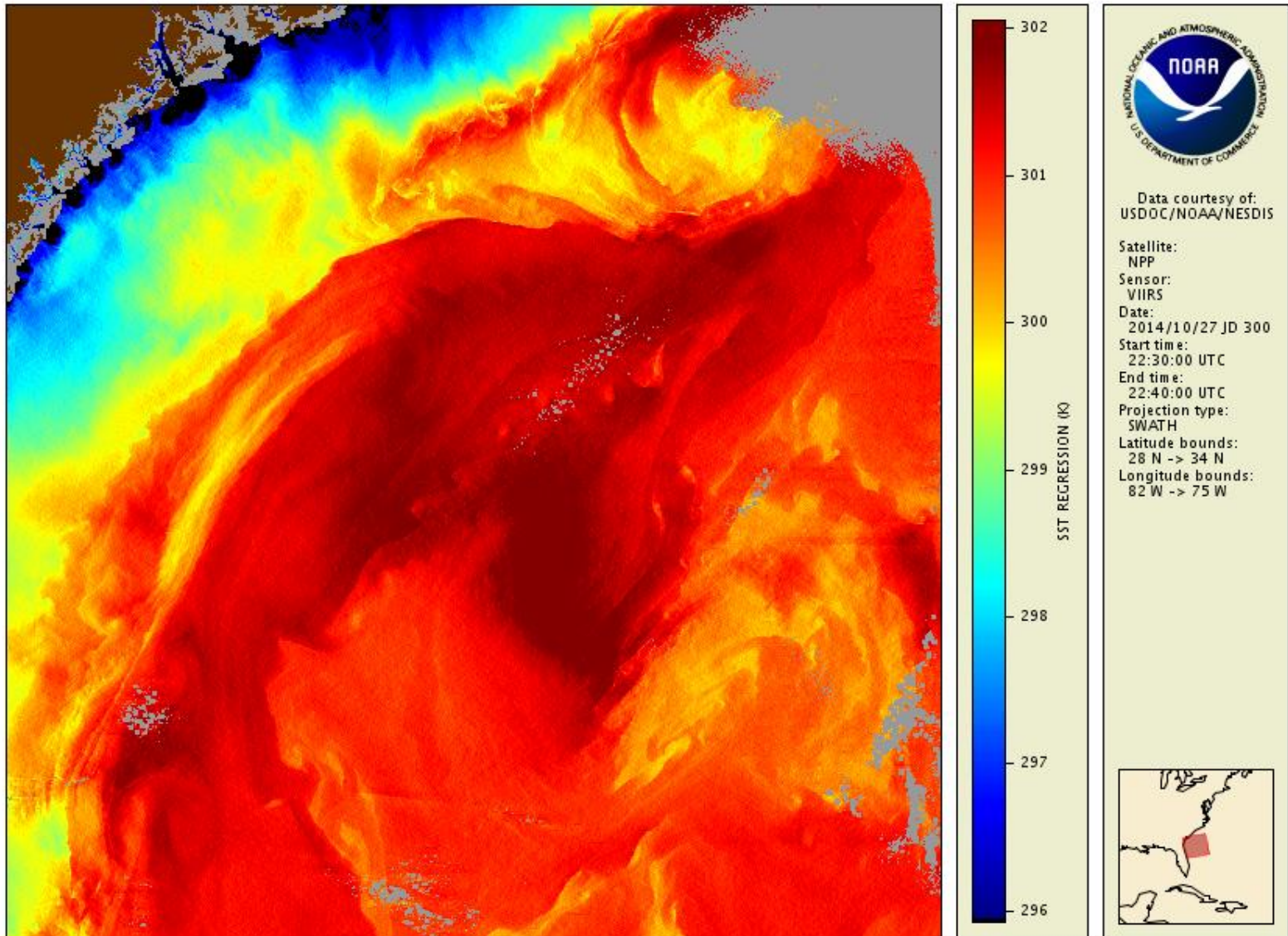- Nighttime STD: ~0.35 K; Daytime: ~0.45K

ACSPO v2.40: SST from original BTs
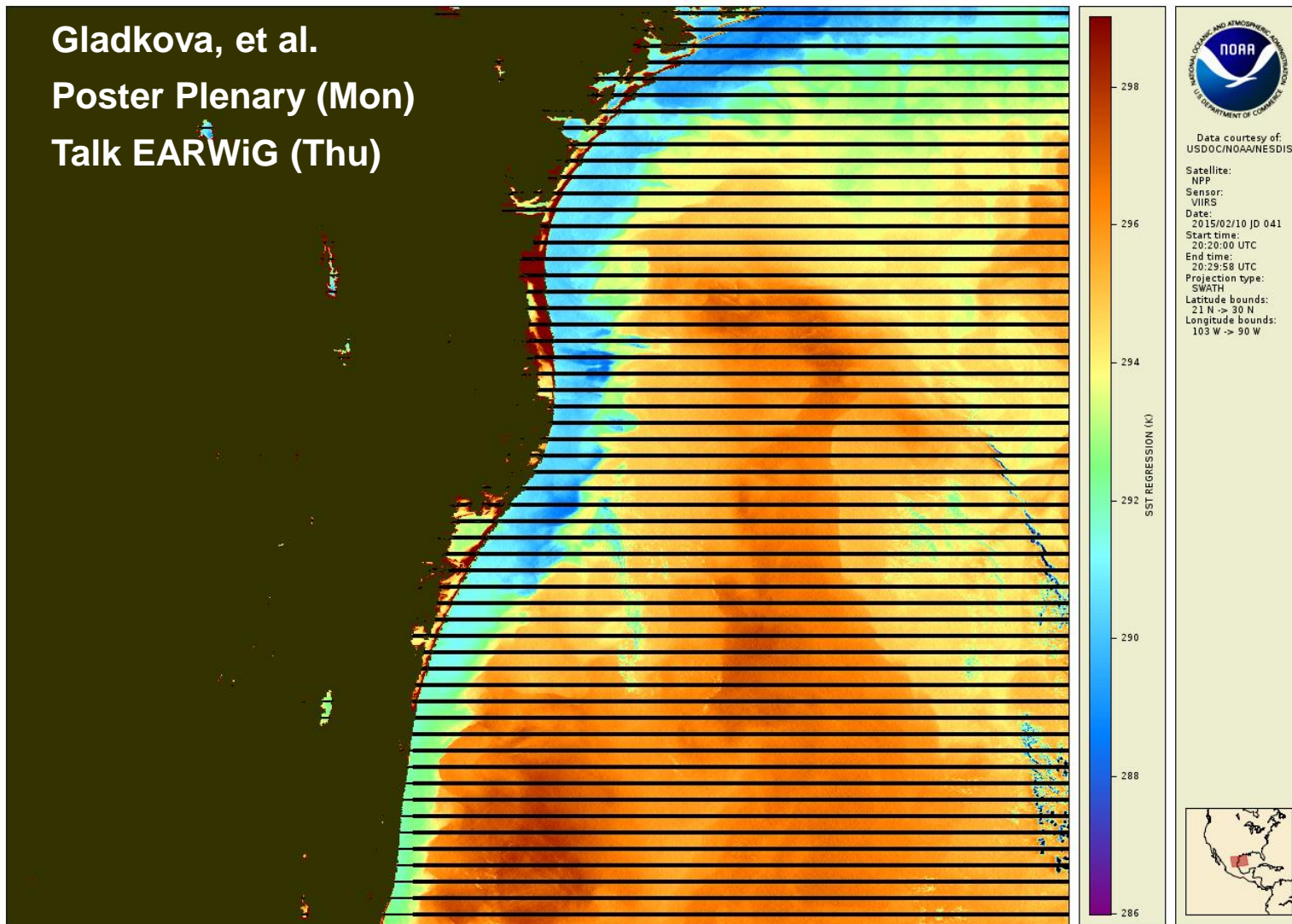
ACSPO SST Products

ACSPO v2.40: SST from destriped BTs

ACSPO SST Products

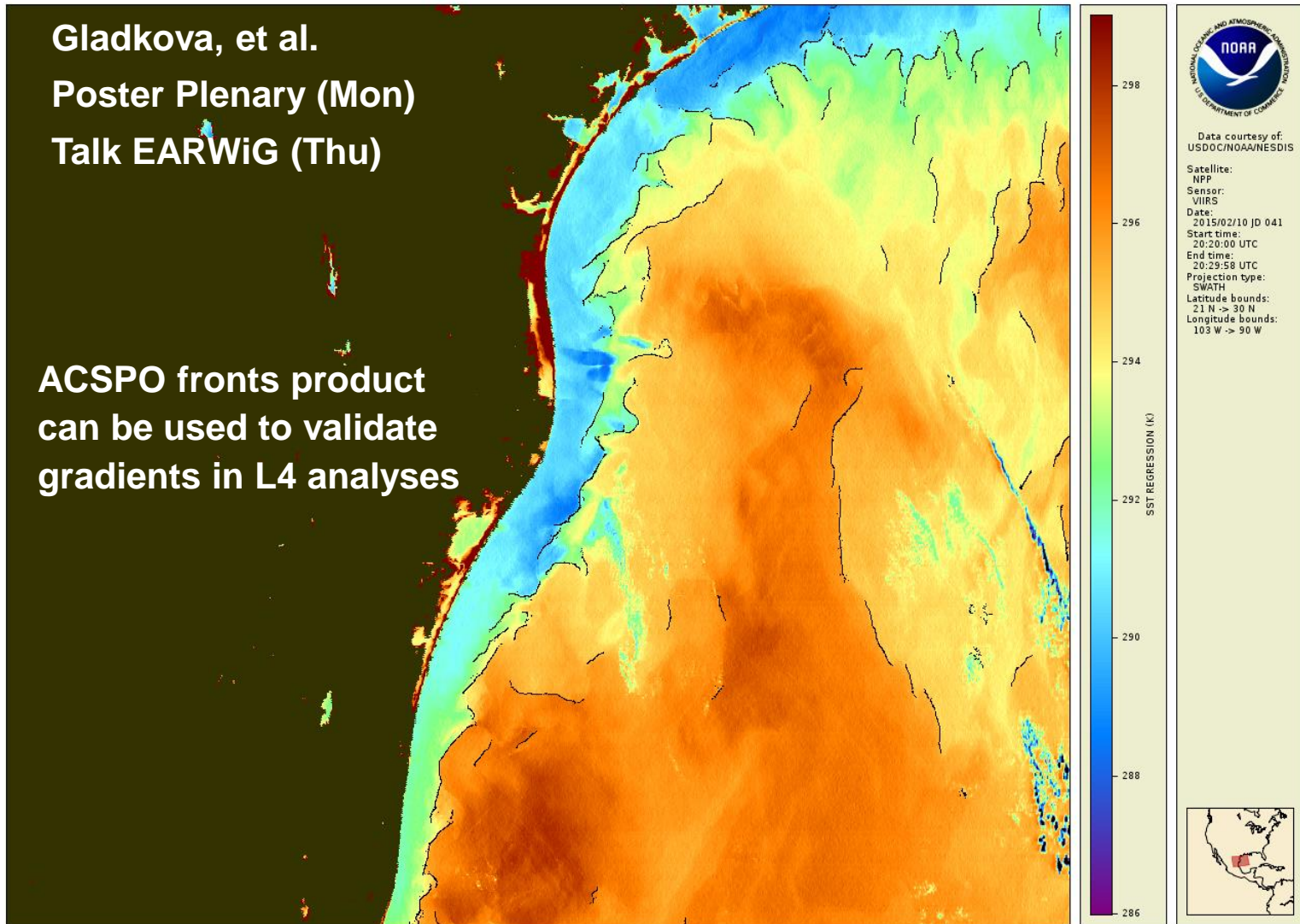# Coming Year (v2.50/2.60):
Improved SST Imagery & Fronts

Gladkova, et al.

Poster Plenary (Mon)

Talk EARWiG (Thu)

ACSPO SST Products

Coming Year (v2.50/2.60): Improved SST Imagery & Fronts

Gladkova, et al.
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Talk EARWiG (Thu)

ACSPO fronts product can be used to validate gradients in L4 analyses

Himawari-8 AHI / GOES-R ABI

- **Progress since G-XV**

  - L2P /GDS2 H8 ACSPO SST experimentally generated at STAR

  - Rotated buffer available at ftp://ftp.star.nesdis.noaa.gov/pub/sod/sst/acspo_data/l2/ahi/

  - Diagnostics in SQUAM available at www.star.nesdis.noaa.gov/sod/sst/squam/GOL/

- **Coming year**

  - Improve clear-sky mask, SST and SSES algorithms in EXP L2P

  - Generate EXP Level 3 product

  - Work to transition to OPS

- **GOES-R launch in March 2016: Preparations underway**

Operational ACSPO VIIRS SST
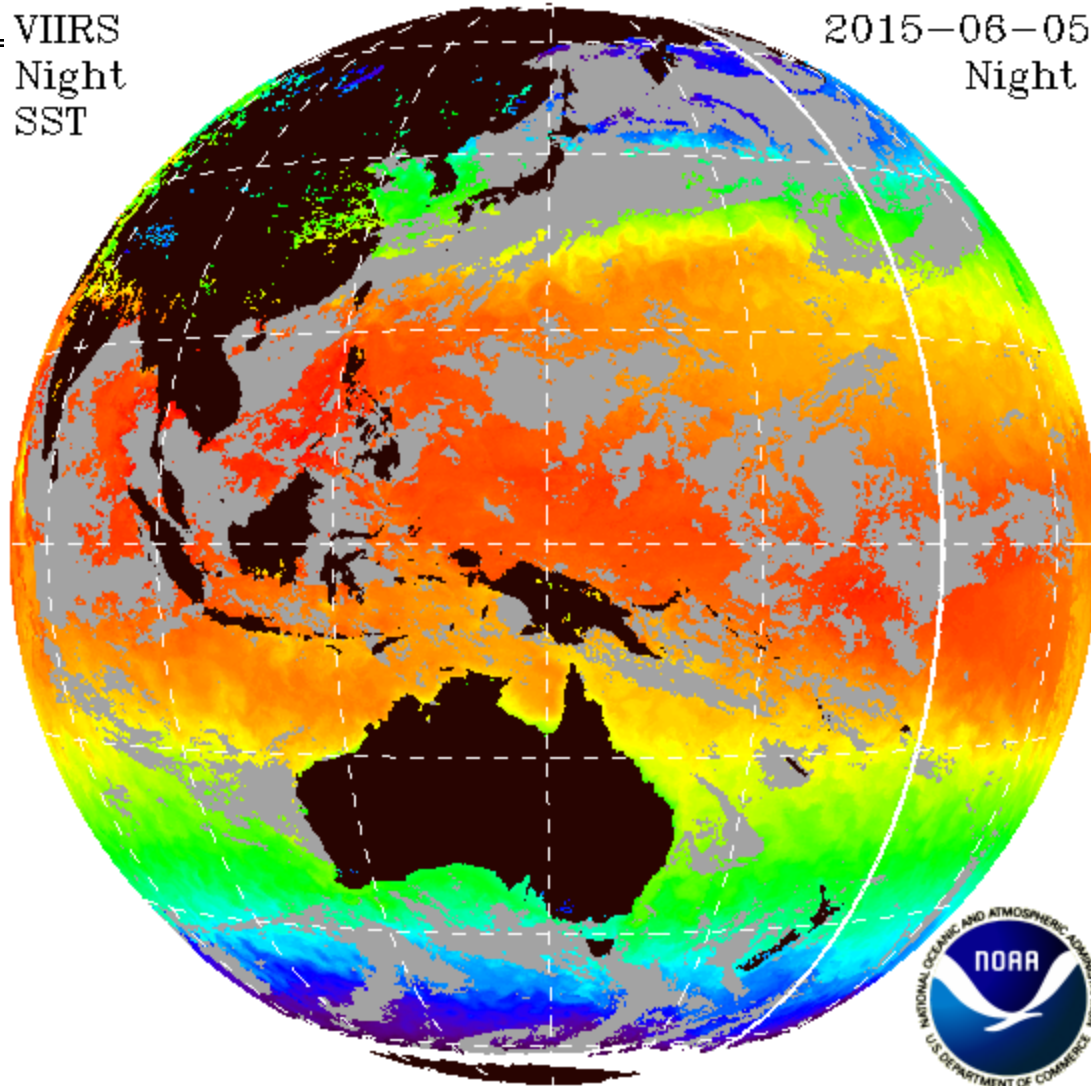
ACSPO SST Products

Experimental ACSPO AHI SST

ACSPO SST Products
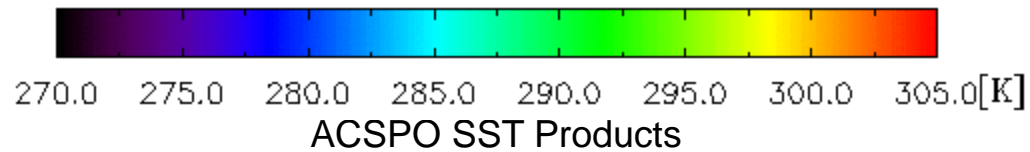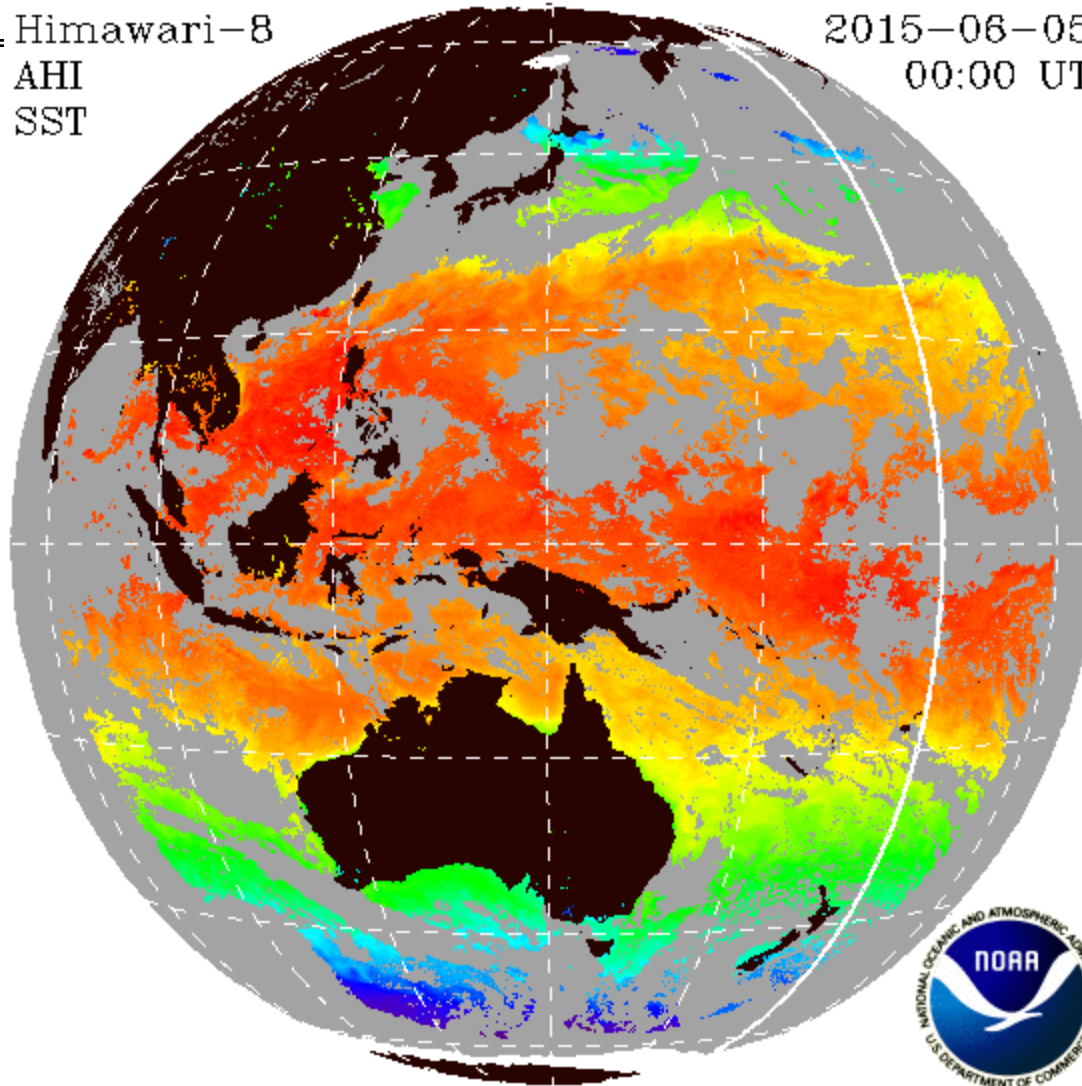
Metop/NOAA AVHRR

- **Two ACSPO versions implemented (v.2.31/2.40)**
  - Fixes to warm low stratus cloud leakages
  - New SSES (see Boris Petrenko presentation on 22 July @8:50am)

- **Progress since G-XV**
  - AVHRR GAC RAN framework set up (1hr granules, L2 production, match-ups with *iQuam in situ* SSTs, SQUAM/MICROS processing and web display)
  - Two beta RANs (ACSPO 2.30/2.31) completed with 7 AVHRRs from Sep 2002 – pr, lessons learned and fixes applied

- **Coming year**
  - Transition OPS L2P to GDS2 → Archive w/GHRSST
  - Generate OPS L3U GDS2 → Archive w/GHRSST
  - Complete RAN1 (w/ACSPO 2.40): Generate L2P/L3U GDS2 → Archive w/GHRSST

# Night Time Series of "ACSPO – *in situ*" SST All AVHRRs for which L1b are available
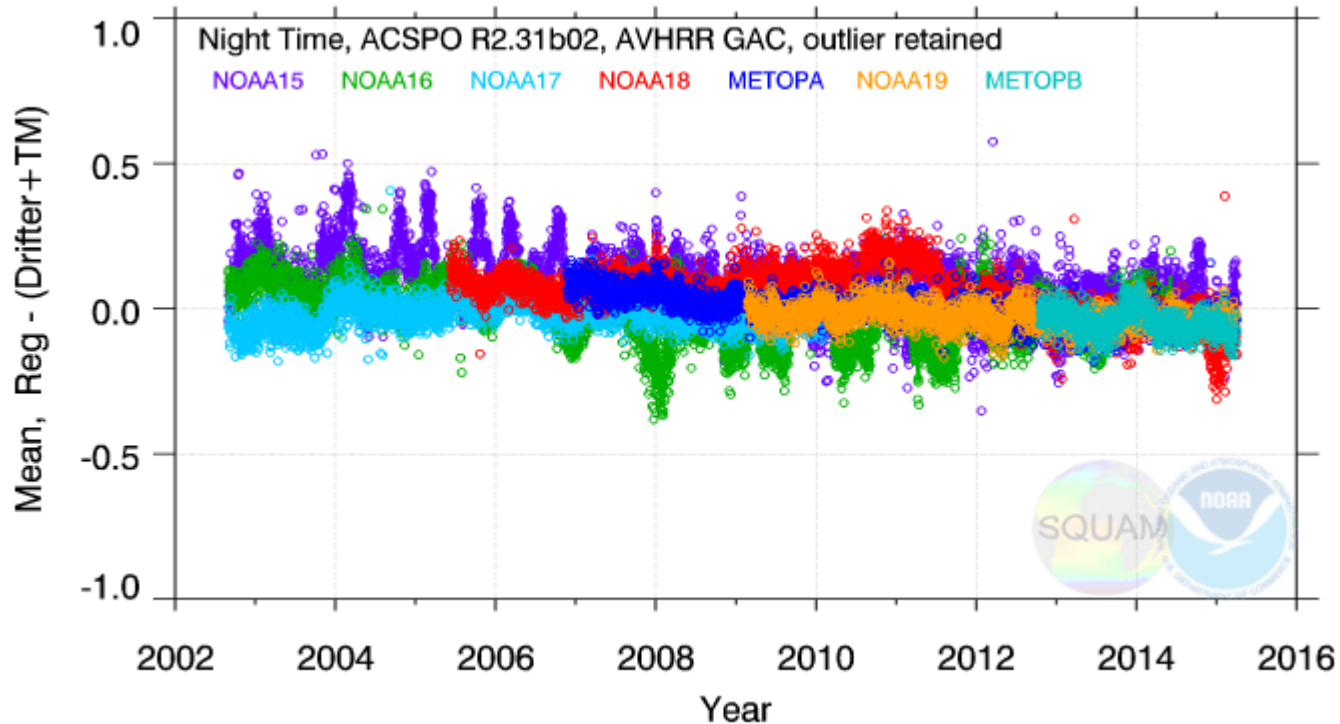
- Shown is ACSPO v2.31 AVHRR GAC RAN1 (Beta 2)
- Processed are 7 AVHRRs from Sep 2002 – pr
- Some sensors are unstable beyond use (e.g., N15)
- Some others are only unstable during some periods (N16, N18)

Night Time Series of "ACSPO – *in situ*" SST
Most stable sensors/periods

Night Time, ACSPO R2.31b02, AVHRR GAC, outlier retained
NOAA16   NOAA17   NOAA18   METOPA   NOAA19
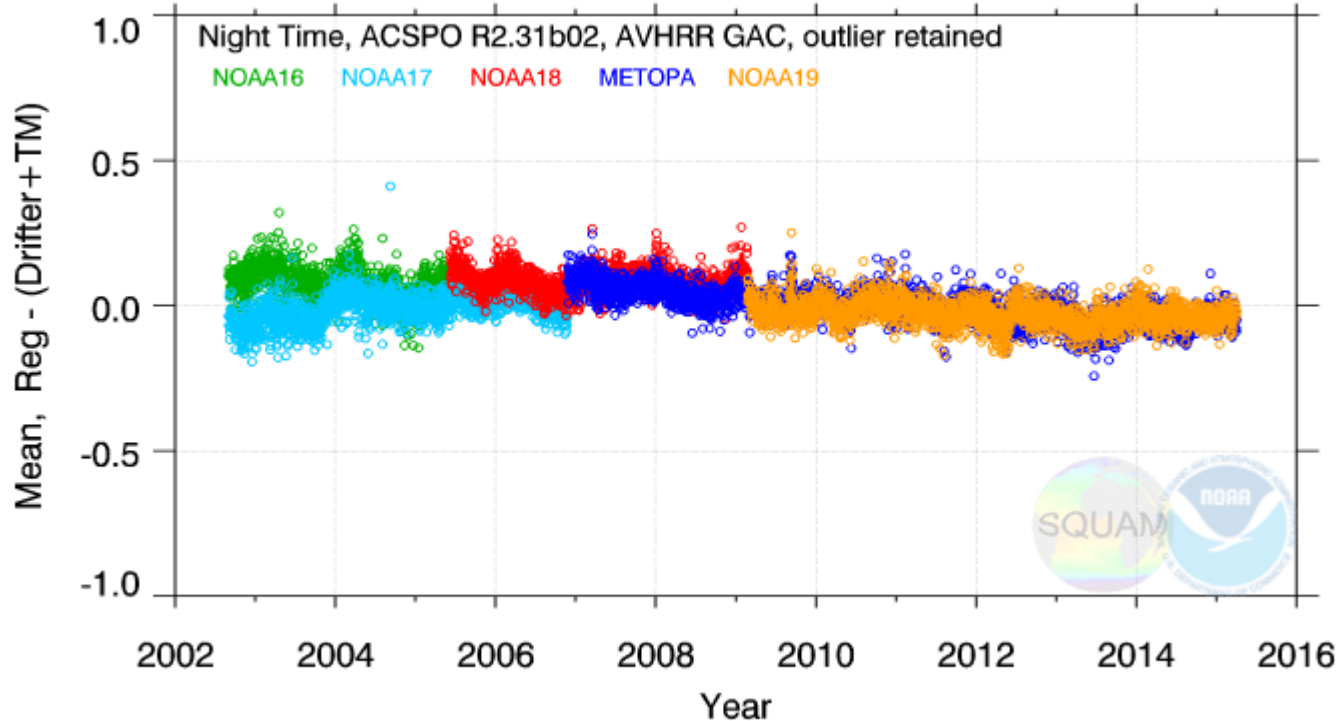
- Unstable sensors/periods excluded (5 AVHRRs remain)
- Two platforms at a time: one mid-AM (N17, Metop-A) and one PM (N16/18/19). These AVHRRs will be processed with v2.40
- SST coefficients may be smoothed in time (as done in Pathfinder)

Topics to discuss at G-XVI

Need help with ACSPO archival with GHRSST

- ✓ S-NPP VIIRS RAN1 Jan 2012 – pr
  - ✓ **L2P**: 40TB + 10TB/yr; **L3U:** 2TB + 0.5TB/yr
- ✓ N16/18/19 and N17/Metop-A AVHRR GAC Sep 2002 – pr
  - ✓ **L2P:** 10TB + 0.6TB/yr; **L3U:** 0.5TB + 0.03TB/yr

Discuss with users testing ACSPO products in L4 analyses

- ✓ VIIRS L3U product
- ✓ ACSPO SSES

Users' feedback on future ACSPO development welcome

- ✓ Improved coverage in dynamic, coastal, and high-latitude ocean
- ✓ New "Ocean Fronts" product – use in validation of L4 gradients

Annual JPSS Meeting (US College Park, 24-28 August 2015)

- ✓ 2breakouts: Product developers and users (~2hr each)

More ACSPO Resources at G-XVI

- Irina Gladkova, Prasanjit Dash, Xinjia Zhou, Poster Session, 20 Jul (Mon), 16:00-18:00

- Boris Petrenko, plenary SSES Talk, 22 Jul (Wed) @8:50

- More on SSES: STVAL/ICTAG/EARWiG/CDR breakouts on 23 Jul (Thu)

- Irina Gladkova, EARWiG breakout, 23 Jul (Thu), 14:30-16:30

Thank You!