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# Status of ACSPO VIIRS SST Reanalysis

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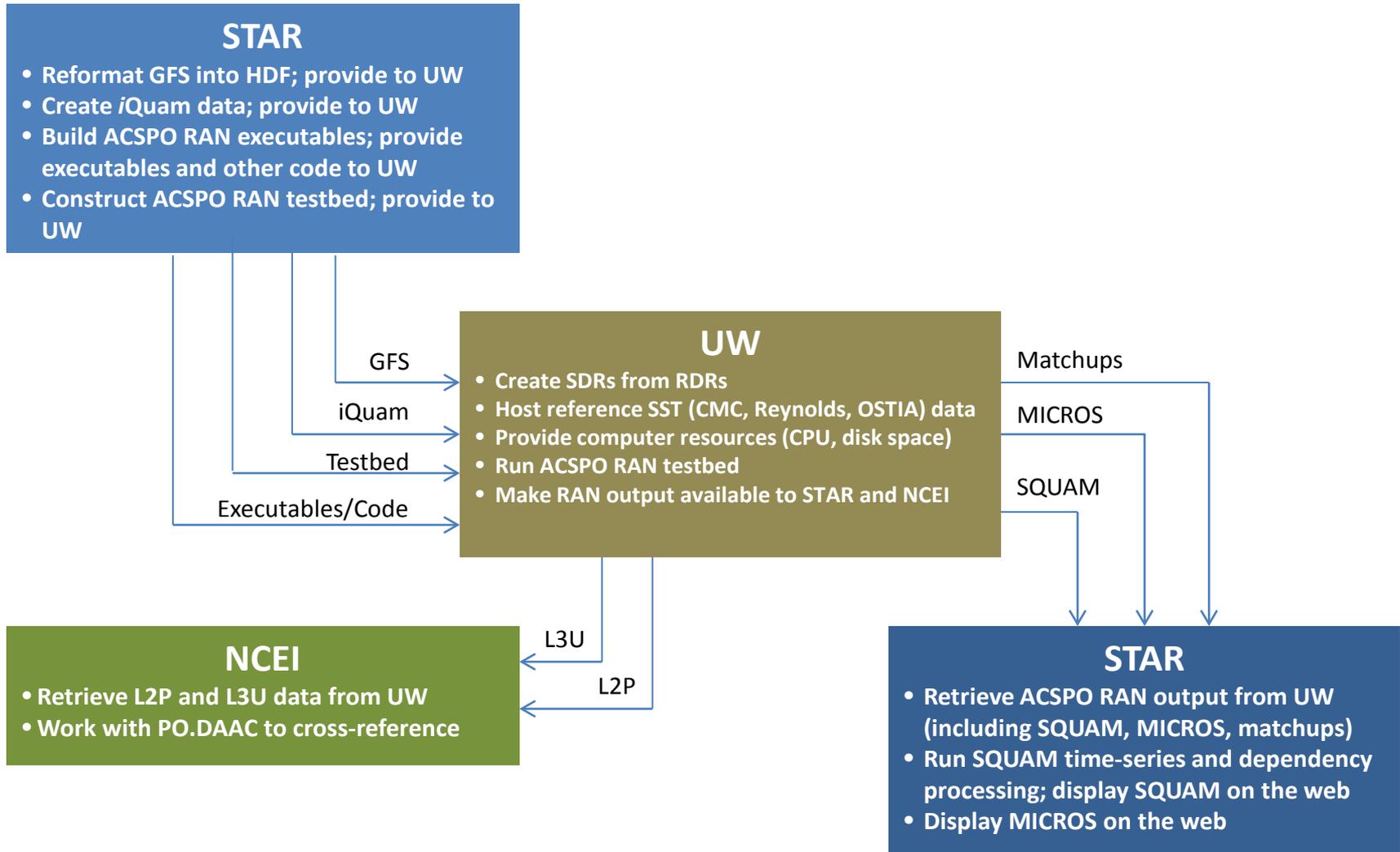
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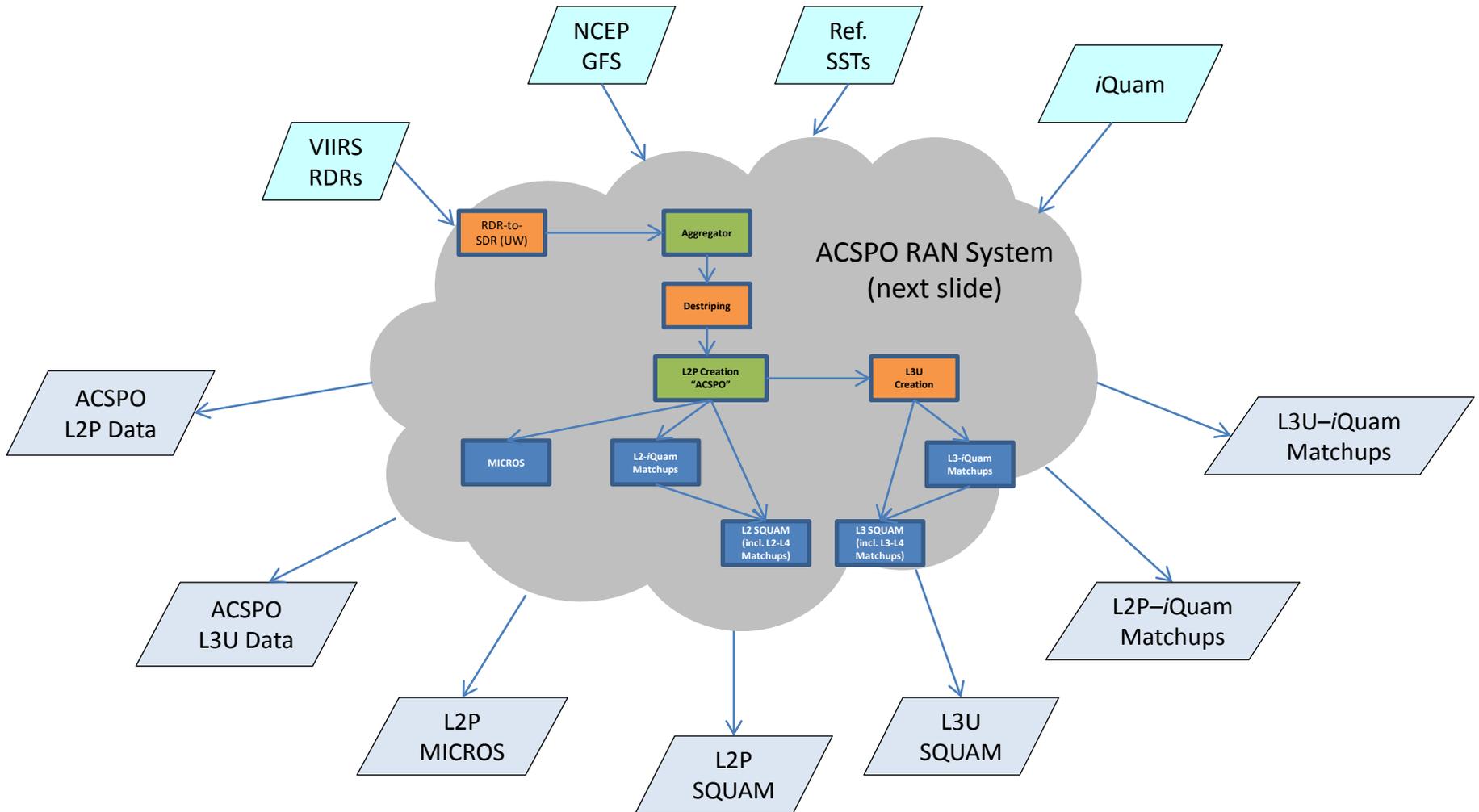
# ACSPO Reanalysis (RAN)

- Objective
  - Reprocess all S-NPP VIIRS data from Jan. 18, 2012 (when cryoradiator doors opened) through “present” using latest ACSPO software
  - Use UW systems for their "horsepower" and data access
    - cluster system has a large number of CPUs/nodes
    - maintain full VIIRS RDR record; host numerous ancillary data
    - UW can generate SDRs from RDRs using CSPP code (instead of using original IDPS SDRs)
- Anticipated Benefits
  - Generate full ACSPO VIIRS record (now archive from May 2014 – on)
  - Greater data availability
    - Should be less missing data (SDRs, ancillary) than seen in NRT processing
  - Better, more consistent VIIRS SDR data
    - E.g., bug that resulted in large BT differences during first WUCD event fixed
  - Better, more consistent ACSPO data
    - 4 upgrades to ACSPO code since Jan. 2012
  - Complete record of ACSPO L3U data
    - Currently data availability (in PO.DAAC and NCEI) starts May 19, 2015; SQUAM monitoring starts Jan. 1, 2015
  - Better overall statistics in MICROS and SQUAM

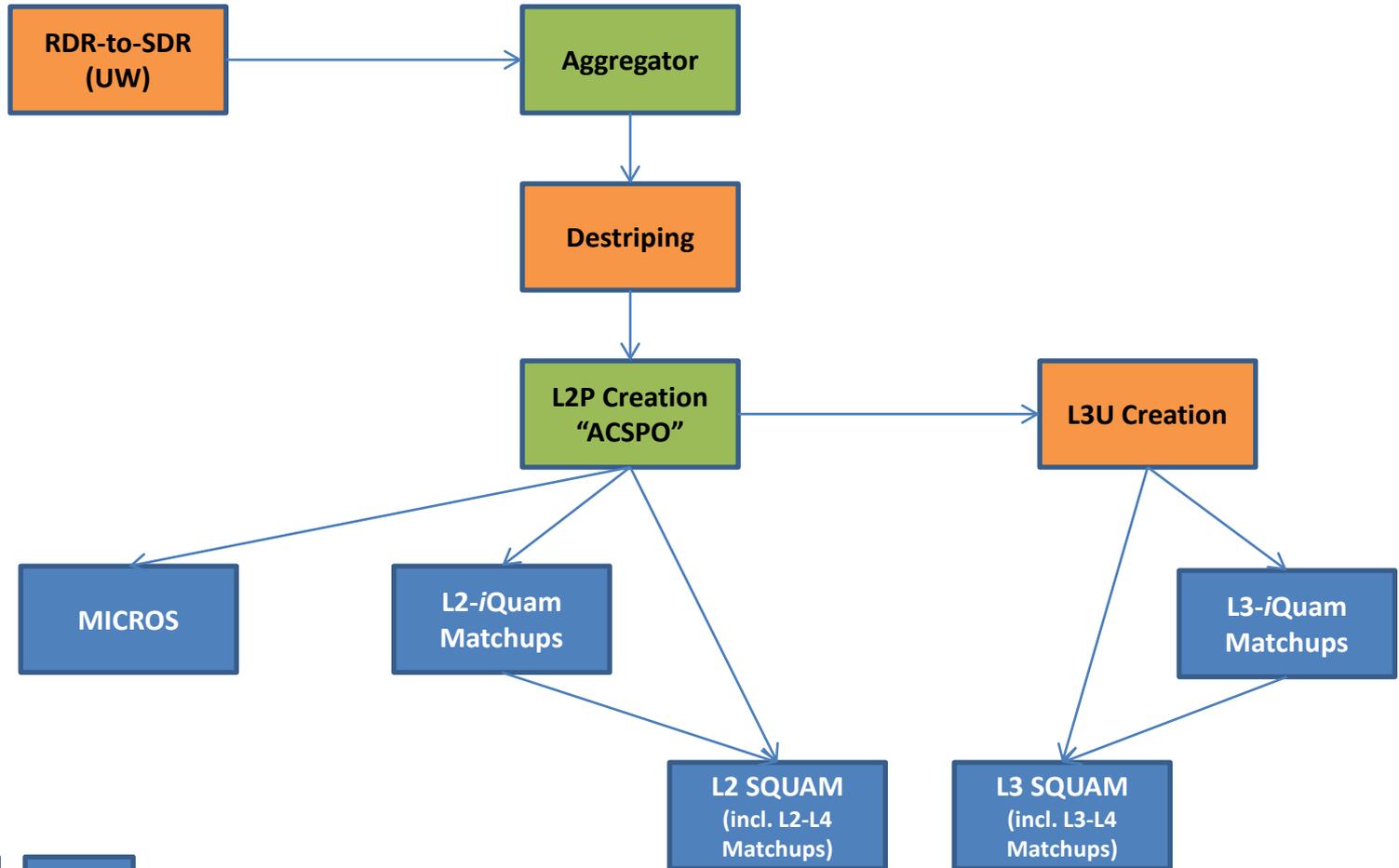
# ACSPO RAN: Conceptual View



# ACSPO RAN: High-Level Data Flow



# ACSPO RAN: Control Flow



# Testbed

- All code and data (except for external data, e.g., reference SST), plus scripts for running ACSPO RAN, are placed in a directory structure, which forms a nearly self-contained reprocessing *testbed*
- The testbed is constructed to process a single day of data assuming that each day of data would be processed on a separate CPU/node within the UW cluster
  - Note that processing of day 'n' begins with the last hour of data from day 'n-1'. This is done to "warm-up" the ACSPO histogram files before day 'n' processing begins.
- All output generated by ACSPO RAN is written to directories in the testbed
  - To provide an extra level of organization and to avoid potential write conflicts, day-specific subdirectories are created within various testbed directories during processing

# Testbed Directory Structure

Directory	Description/Content
acsपो	<i>ACSPPO output files</i>
gds2_l2p	<i>GDS2 L2P SST files created by ACSPPO</i>
gds2_l3u	<i>GDS2 L3U SST files created by the L2P-to-L3U tool</i>
legacy	<i>Legacy SST files created by ACSPPO</i>
agg_sdrs	<i>10-minute aggregated SDR-like files created by Aggregator</i>
anc	<i>Ancillary files used by ACSPPO RAN</i>
bin	<i>Executable files and supporting scripts for running ACSPPO RAN</i>
config	<i>Various configuration and control files</i>
iQUAM	<i>Symlink to directory of iQuam1 data</i>
iQUAM2	<i>Symlink to directory of iQuam2 data</i>
log	<i>Log files</i>
matchup	<i>Matchup code, plus files created by the matchup processing using iQuam1 data</i>
L2	<i>L2-specific matchup code and files</i>
L3	<i>L3-specific matchup code and files</i>
matchup2	<i>Matchup code, plus files created by the matchup processing using iQuam2 data (future)</i>
L2	<i>L2-specific code and files</i>
L3	<i>L3-specific code and files</i>
MICROS	<i>MICROS working directory; MICROS code and files in their expected directory structure</i>
SQUAM	<i>SQUAM working directory; SQUAM code and files in their expected directory structure</i>
web_folder	<i>Web content (figures, images, etc.) generated by MICROS and SQUAM processing</i>
MICROS	<i>MICROS web content</i>
SQUAM	<i>SQUAM web content</i>

# Testbed “Run” Scripts

Script	Description
run_vagg.bash	Runs the VIIRS Aggregator executable
run_destripe.bash	Runs the VIIRS destriping executable
run_acspo.bash	Runs the ACSPO executable
run_toL3U.bash	Runs the L2P-to-L3U executable
run_micros.bash	Runs MICROS
run_l2matchup.bash	Runs L2- <i>i</i> Quam matchups
run_l2squam.bash	Runs L2 SQUAM
run_l3matchup.bash	Runs L3- <i>i</i> Quam matchups
run_l3squam.bash	Runs L3 SQUAM

- All scripts require 1 command-line argument, the date of the data to process
- Most scripts have optional command-line arguments to override various default input (e.g., directories, files, parameters)

# Issues Encountered

- Anomalous days seen in data/statistics (upcoming slides)
  - Need further analysis and rerun
- IDL
  - License limitation on UW cluster
    - UW worked out a 30-day trial of a 512-count run-time (RT) license
  - Executing IDL in RT mode required code and script modifications
    - UW took the lead changing all MICROS code/scripts
    - STAR modified SQUAM and matchup code/scripts
  - Discovered bug in IDL 8.2, the version on the cluster, that prevented the matchup code from running in RT mode
    - Matchup code runs pretty quick so UW ran it using their more limited number of development licenses
- Testbed
  - A script bug, which was quickly identified and fixed, prevented MICROS files from being moved to web folder
  - Several mid-stream changes made to matchup code/script for handling *iQuam1* and *iQuam2* data
  - Switching to RT mode turned up a minor issue with SQUAM, which UW took care of with a workaround
- Different chipset used for cluster (AMD) than development platform (Intel)

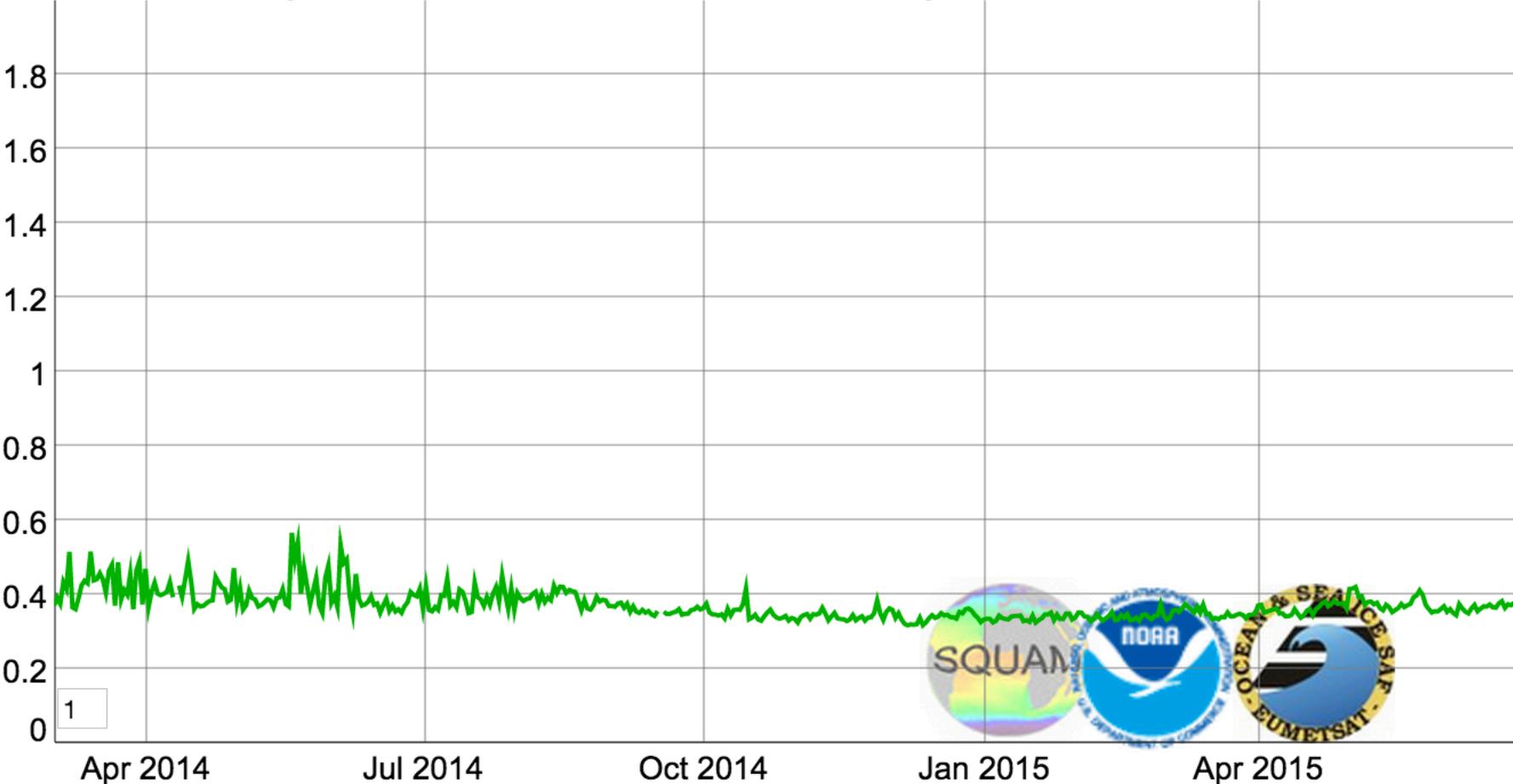
# ACSPO RAN Results: Data

- ACSPO GDS2 L2P data
  - March 2, 2012 – June 25, 2015
  
- ACSPO GDS2 L3U data
  - March 2, 2012 – June 25, 2015

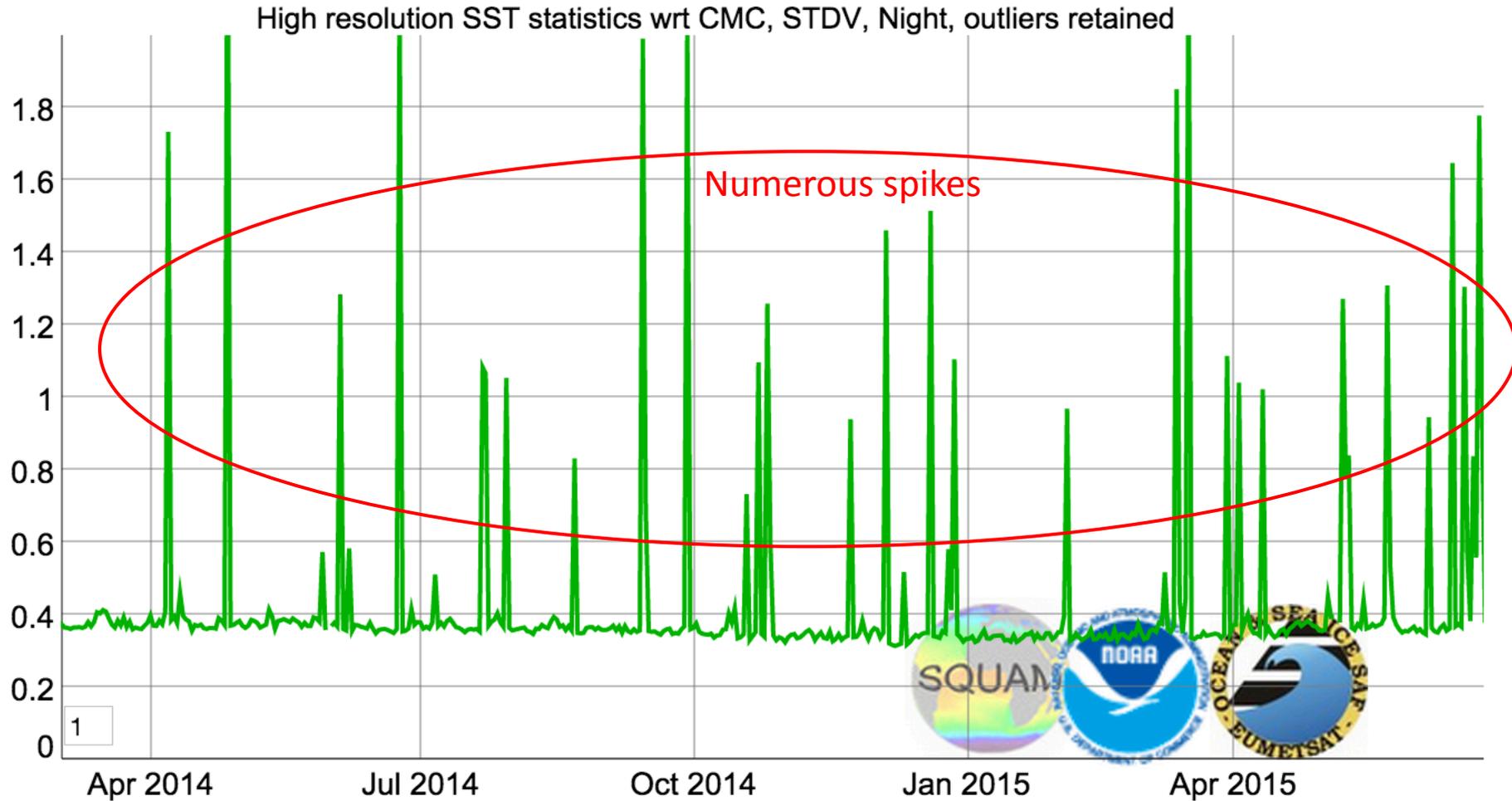
# ACSPO RAN Results: Monitoring

# SQUAM: NRT Timeseries

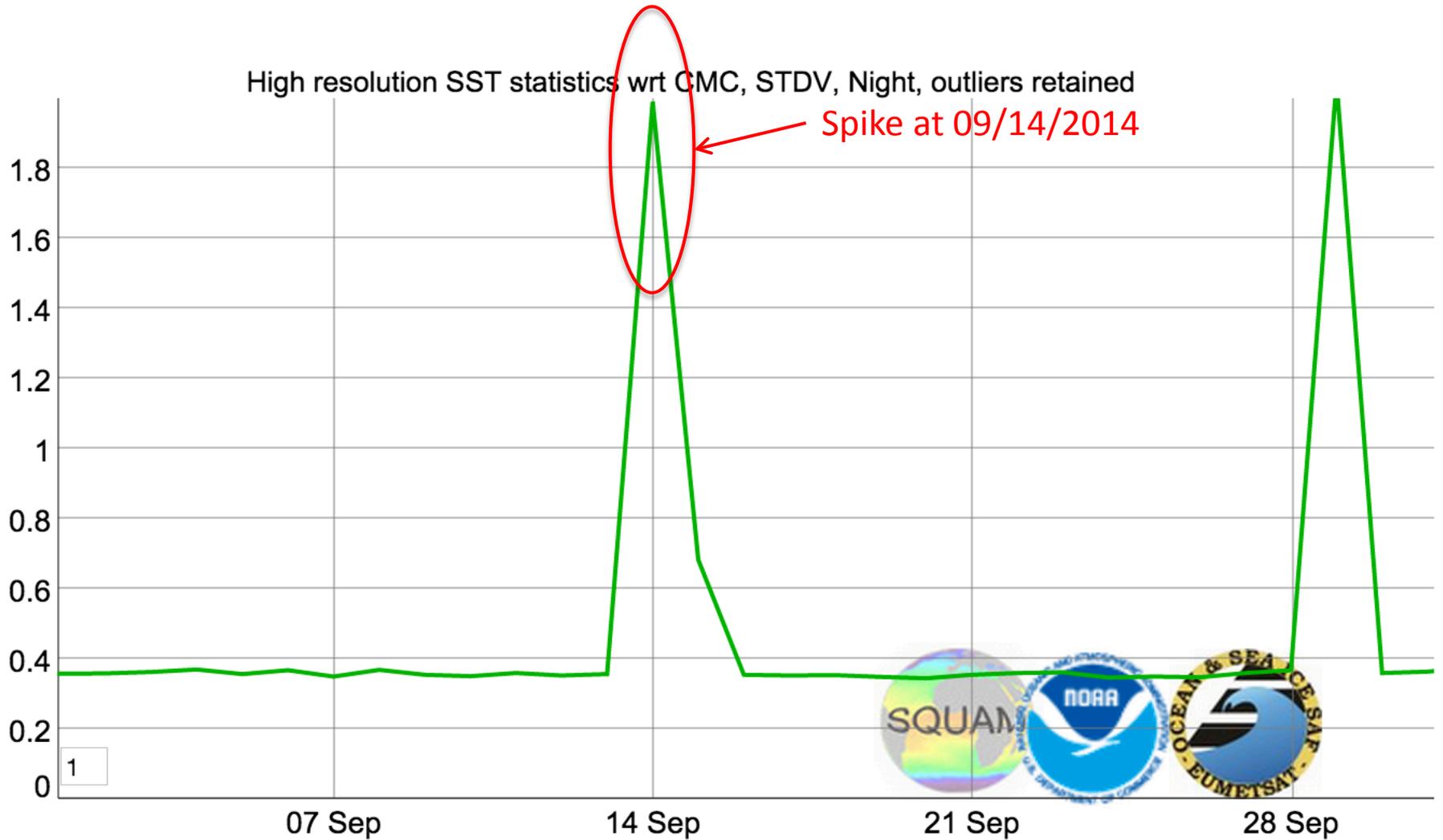
High resolution SST statistics wrt CMC, STDV, Night, outliers retained



# SQUAM: RAN Timeseries

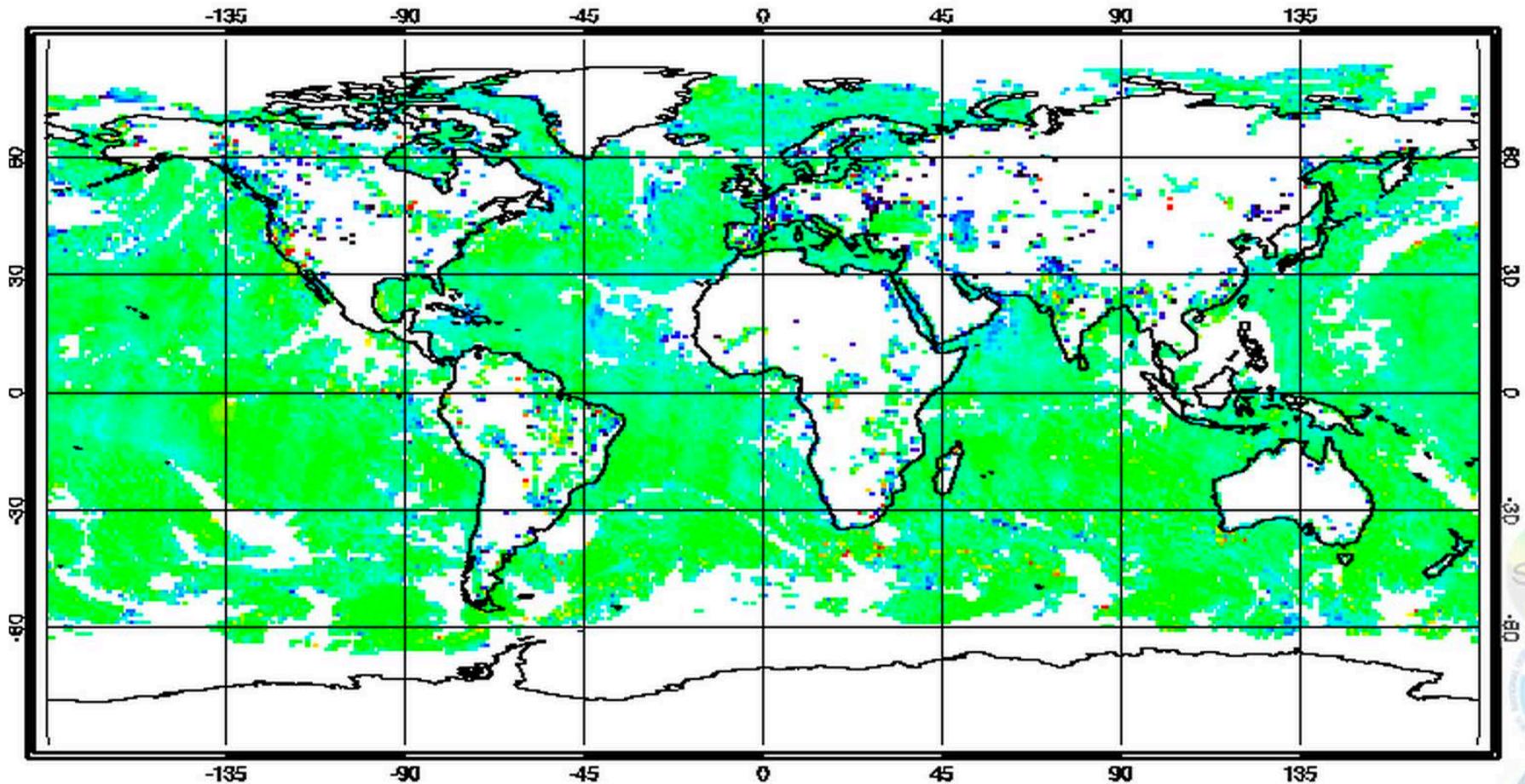


# SQUAM: RAN, Timeseries



# SQUAM: NRT, Map

SST-CMC NPP 20140914 Night ACSPO V2.31



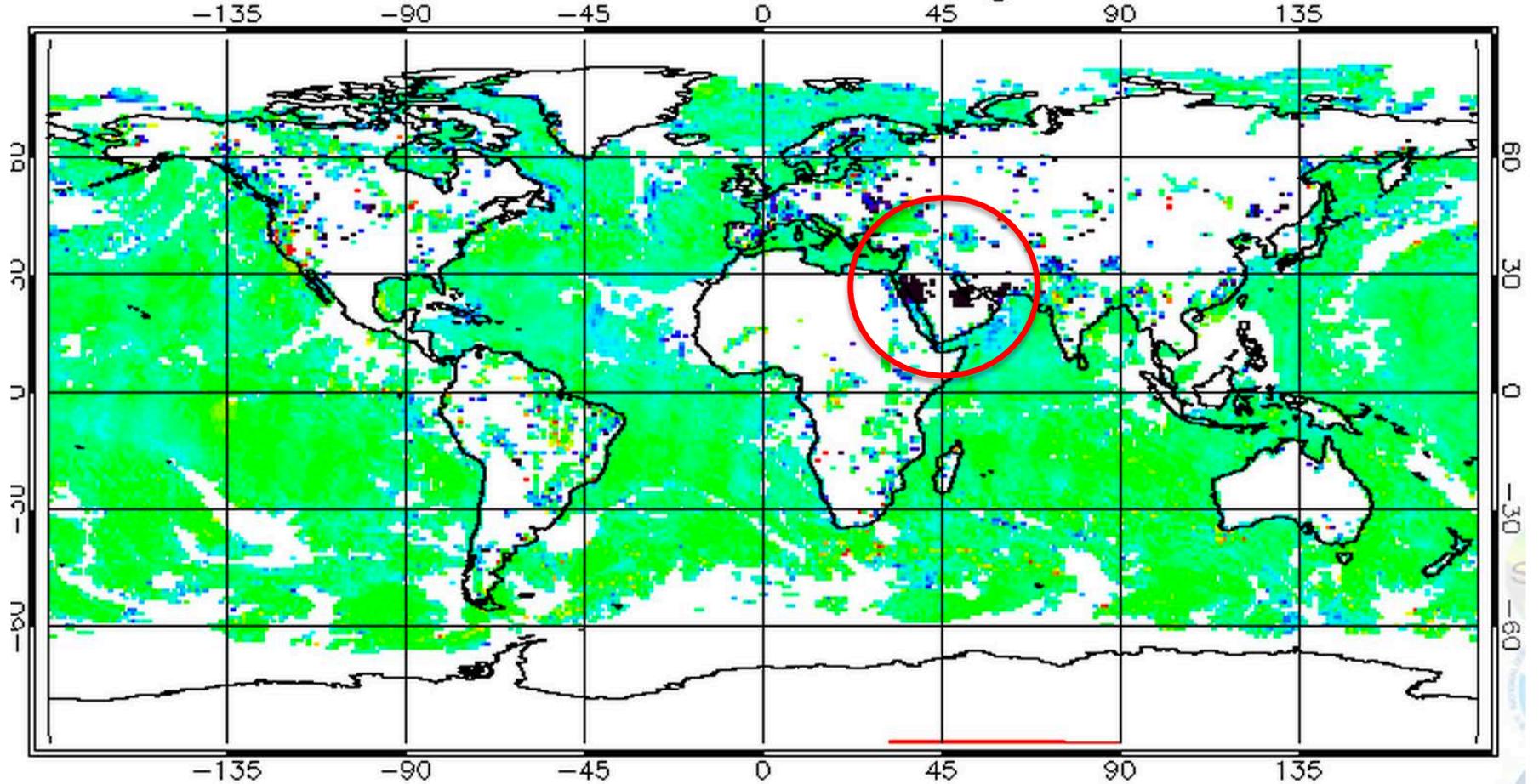
27 August 2015

ACSPO VIIRS SST RAN1

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# SQUAM: RAN, Map

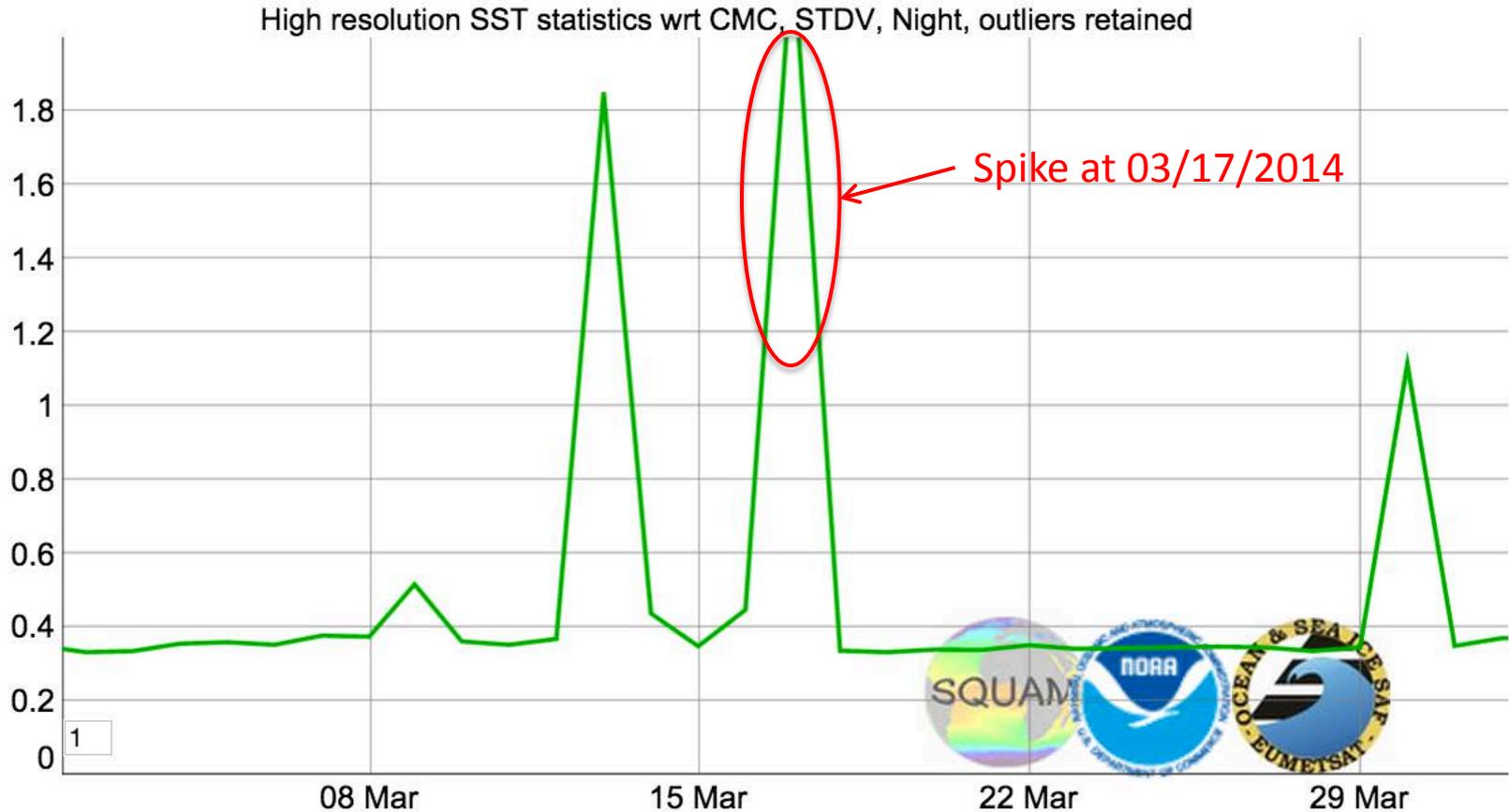
SST-CMC NPP UW 20140914 Night ACSP0 V2.40



27 August 2015

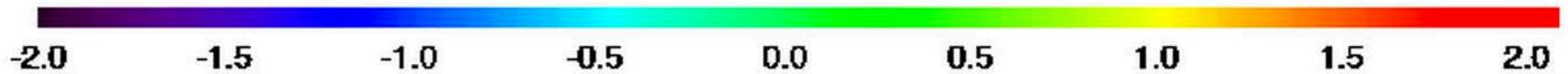
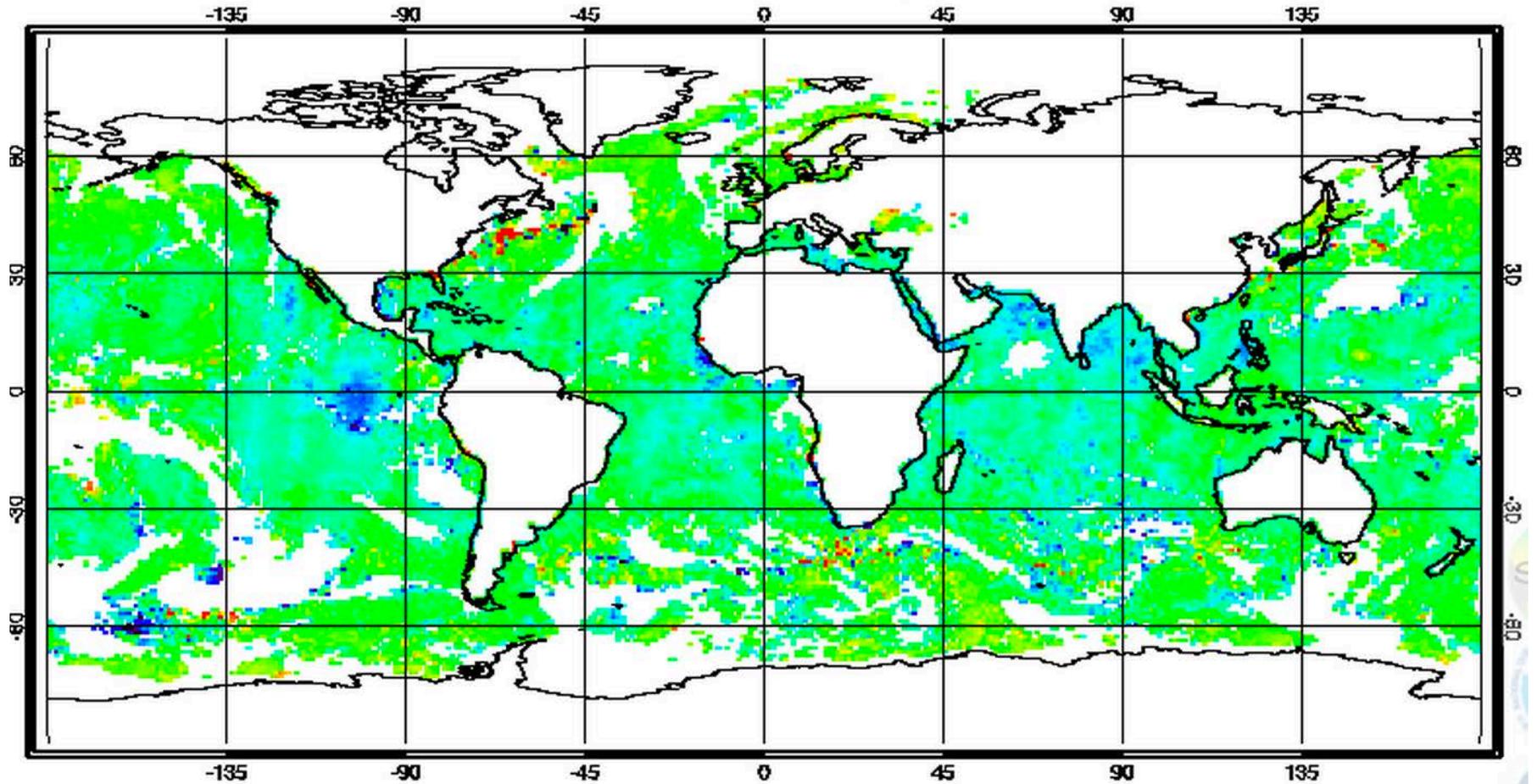
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# SQUAM: RAN, Timeseries



# SQUAM: NRT, Map

SST-OSTIA NPP 20150317 Night ACSPO V2.40



27 August 2015

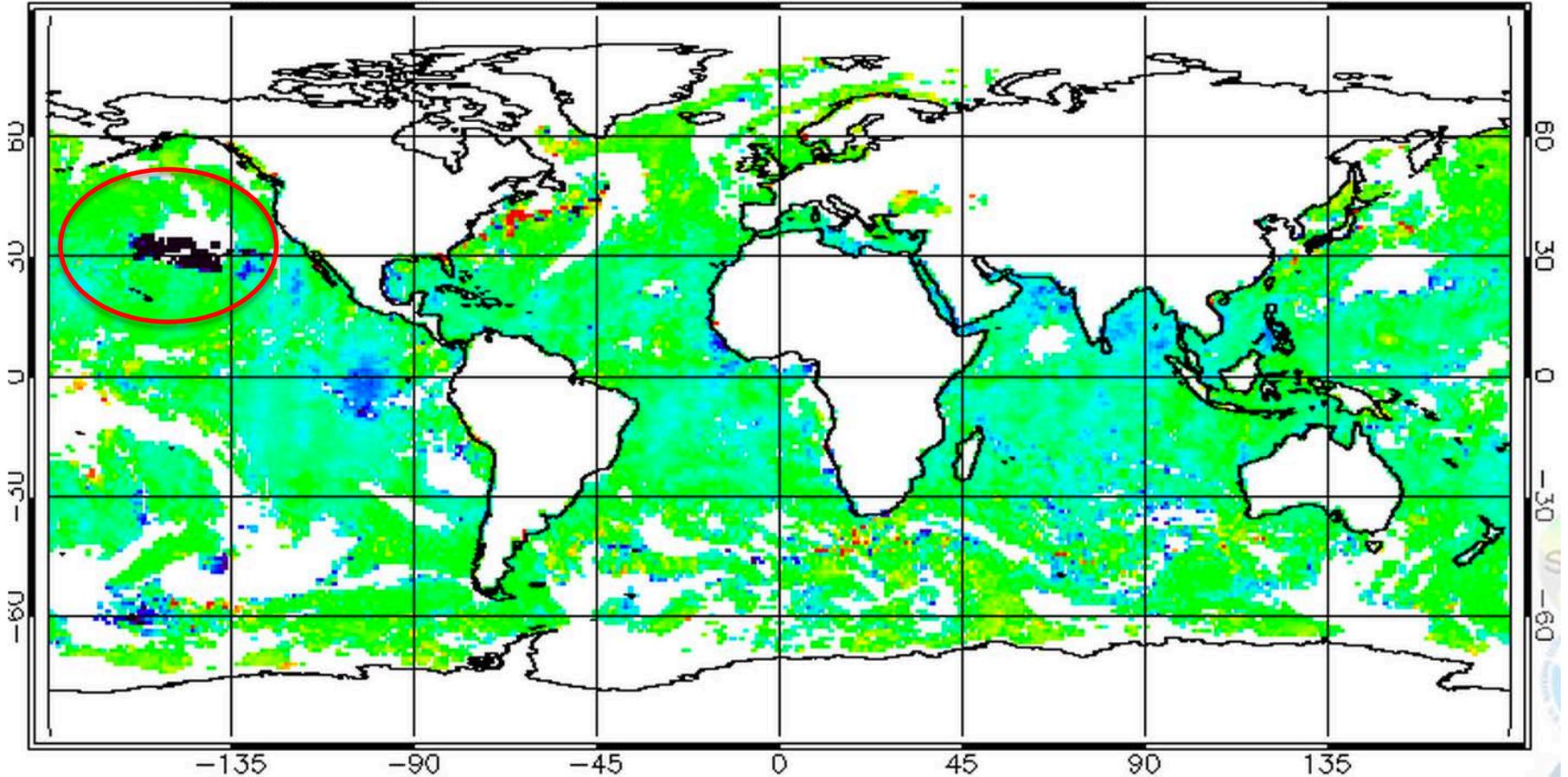
ACSPO VIIRS SST RAN1

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# SQUAM: RAN, Map

SST-OSTIA NPP UW 20150317 Night ACSP0 V2.40

-135 -90 -45 0 45 90 135



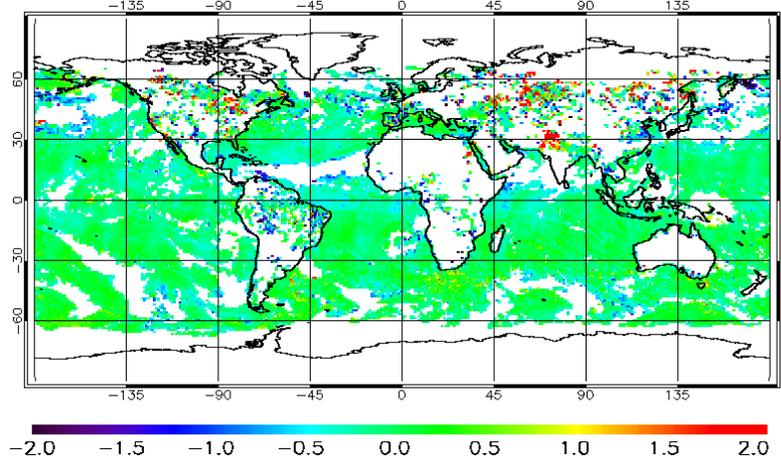
27 August 2015

ACSP0 VIIRS SST RAN1

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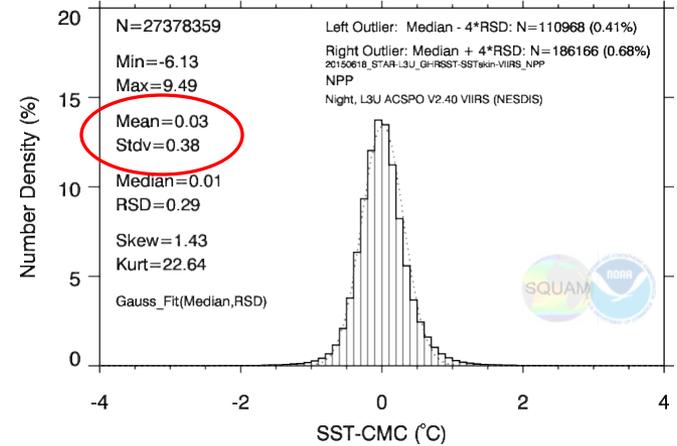
# SQUAM L3: NRT vs. RAN

VIIRS L3U - CMC L4, 20150618 Night ACSP0 V2.40

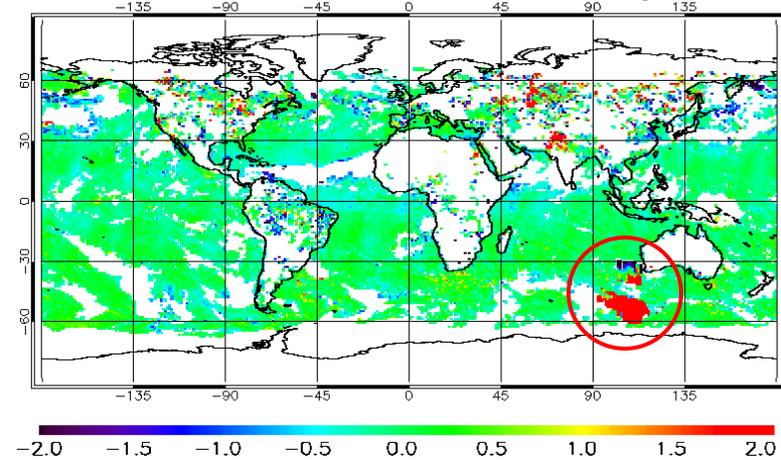


NRT

ACSP0 VIIRS L3U - CMC L4, 20150618

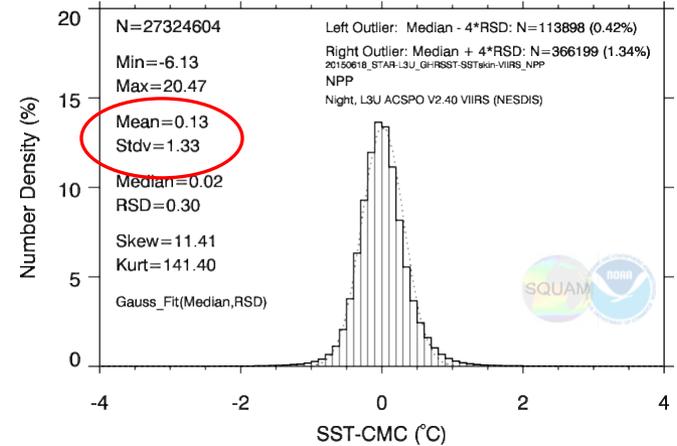


ACSP0 VIIRS L3U - CMC L4 20150618 Night V2.40

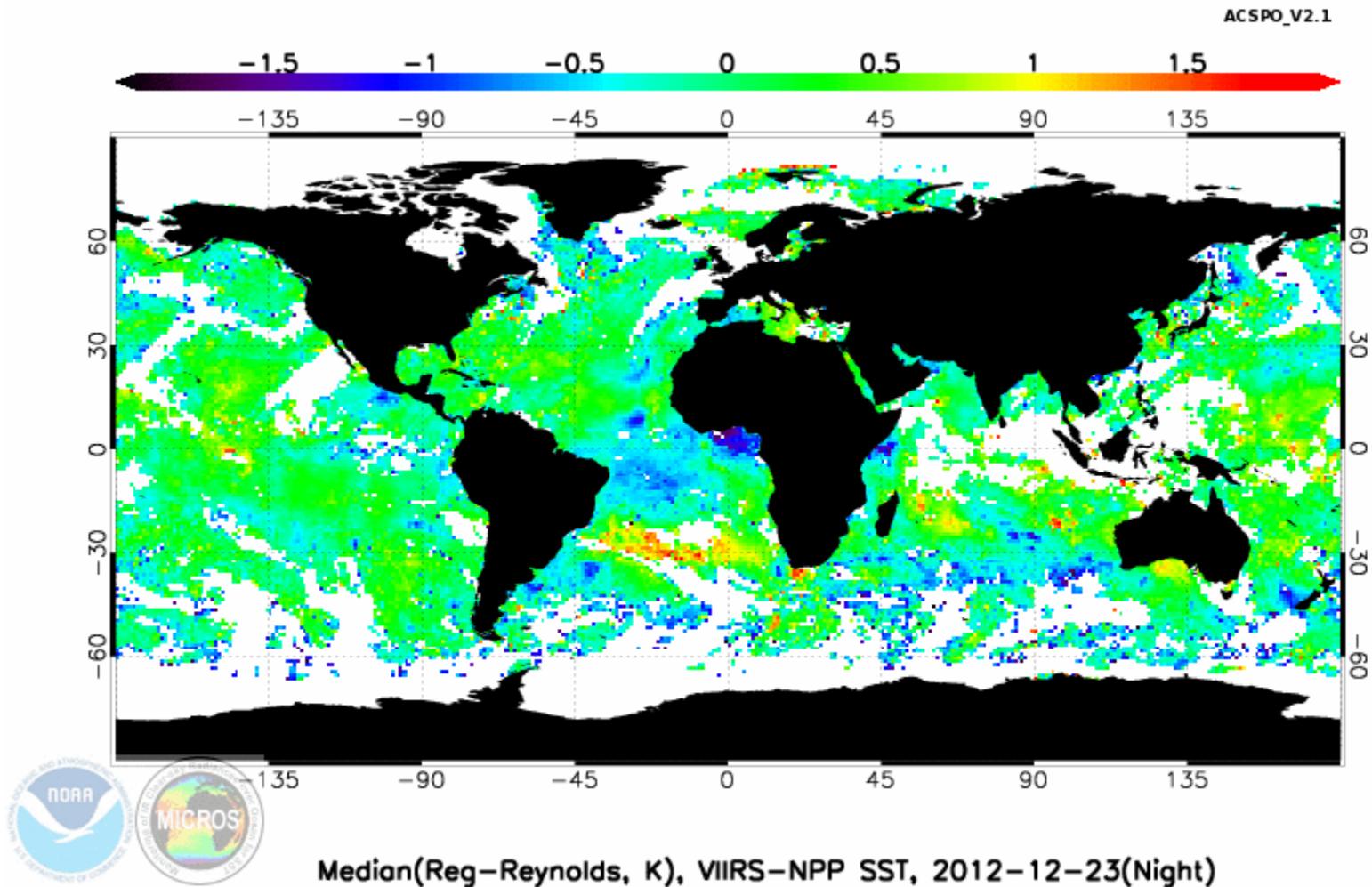


RAN

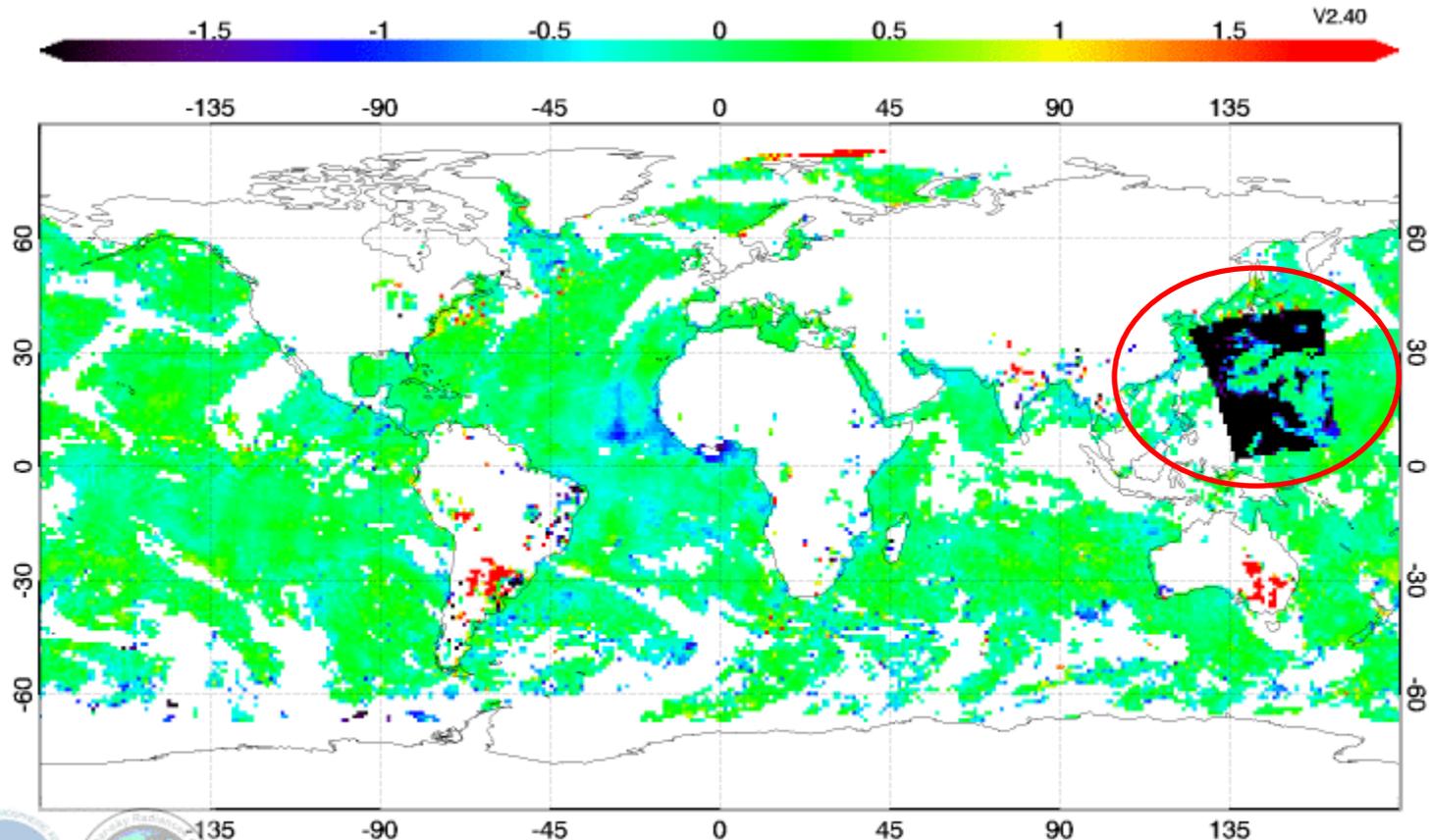
ACSP0 VIIRS L3U - CMC L4, 20150618



# MICROS: NRT, SST, Night, 12/23/2012



# MICROS: RAN, SST, Night, 12/23/2012



Median(Reg-Reference, K), VIIRS-NPP SST, 2012-12-23(Night)

# Things To Do

- Complete the current ACSPO reanalysis effort (RAN1):
  - **Identify problematic/outlier days, fix, and rerun**
  - Fill-in missing time periods (e.g., 1/18/2012 – 3/1/2012)
  - Generate matchups with *iQuam2* data
- Update MICROS IDL and script to allow execution in RT mode (i.e., implement the UW changes)
- Upgrade UW system to IDL 8.4 to permit matchup code running in RT mode
- Refine STAR-UW processes for improved code delivery and data availability
- Per further NOAA-UW agreements, perform additional reprocessing runs (i.e., RAN2, RAN3,...) as ACSPO continues to improve and mature