

A satellite is shown in space, with its solar panels and instruments visible. The background is a bright, hazy blue, suggesting the Earth's atmosphere or the sun's glow.

# Operational SSTs at NCDC

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# SST Overview

- **Produce accurate SST Analyses**
  - Extended Reconstruction SSTs (ERSST) with associated surface land temperatures
    - In situ only: 1854 to present
  - Optimum Interpolation (OI) Daily SSTs
    - Satellite + in situ: 1981 to present
- **Current/expected user communities**
  - Climate monitoring and diagnostics
  - Weather including hurricane forecasting
  - Fisheries for SST gradients
  - Boundary condition for atmospheric models

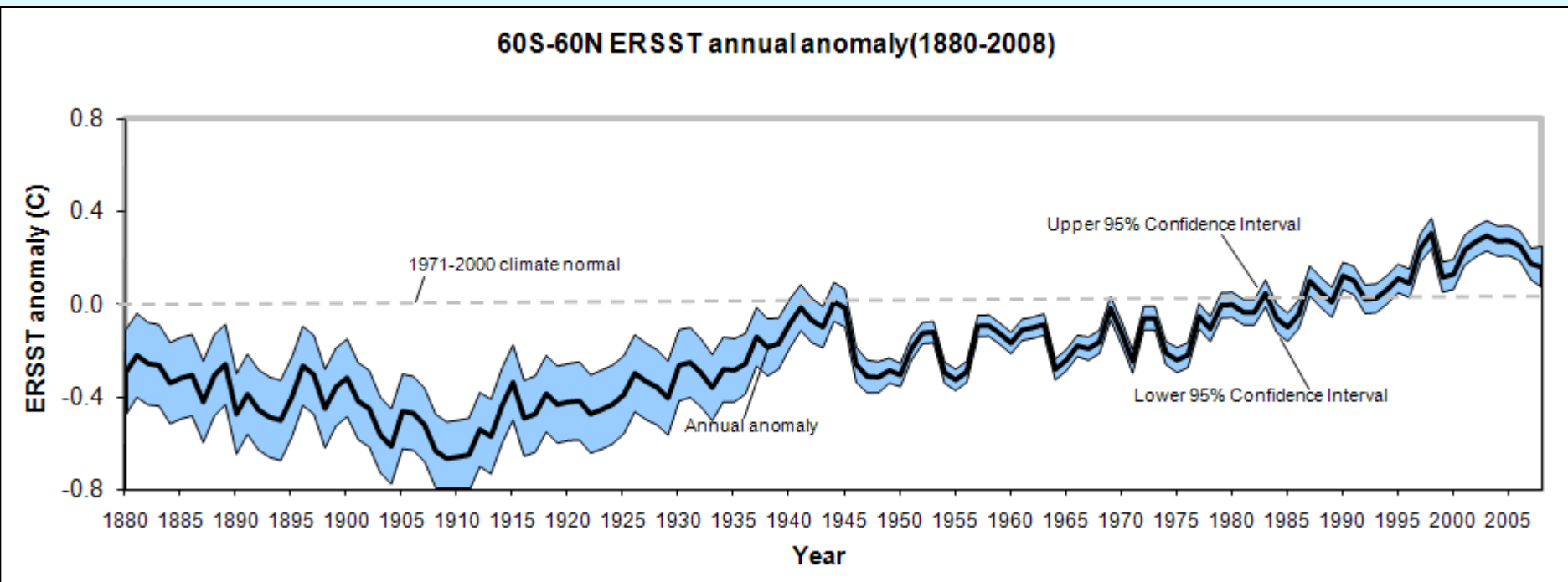
# ERSST Version 3b

## ■ Project Goals

- Provide historic SST monthly analyses from 1854 to present on a 2° spatial grid
- Merge SST and land surface temperatures to produce global surface temperatures from 1880 to present on a 5° spatial grid

# ERSST Version 3b

- Purpose: to monitor climate change



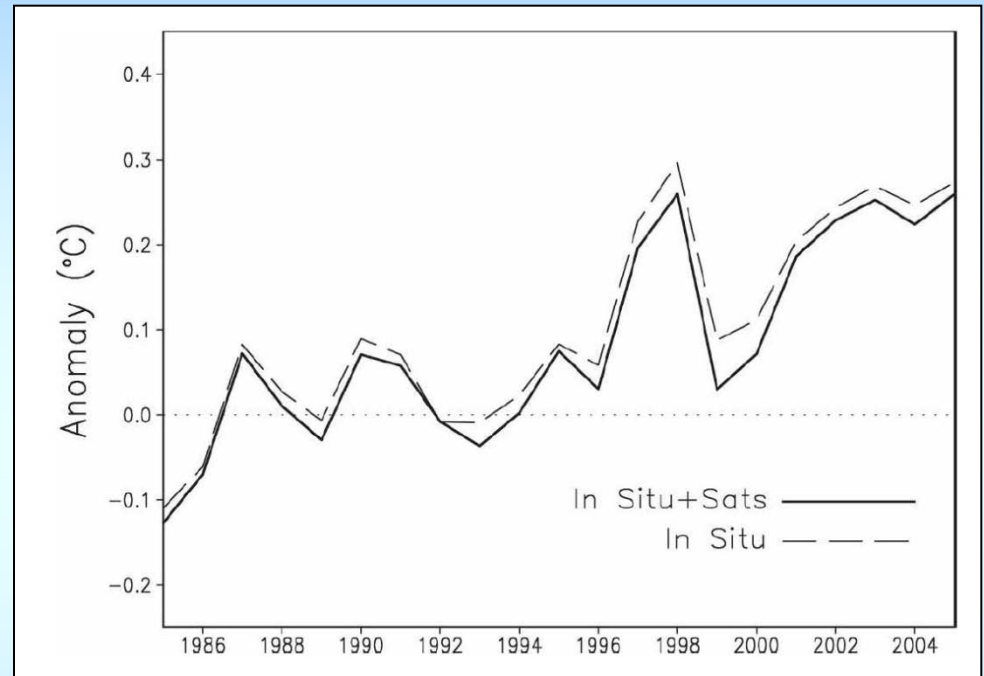
# ERSST Version 3b

## ■ Current Status

- Improved tuning procedures which results in stronger anomalies prior to 1930
- Version 3b available without AVHRR satellite data
  - Residual Pathfinder AVHRR biases impact climate signal

# ERSST Version 3b

Annual SST anomaly  
between 60°S and 60°N for  
analyses with and without  
bias-adjusted satellite  
data



Looking Forward: Correct ship biases

# Daily OI Version 2

## ■ Project Goals

- Produce Daily OI on  $1/4^\circ$  spatial grid
- Include satellite bias correction with respect to in situ data
- Compute analysis for entire period with satellite data
- Make product useful for climate and weather

# Daily OI Version 2

## ■ Current Status

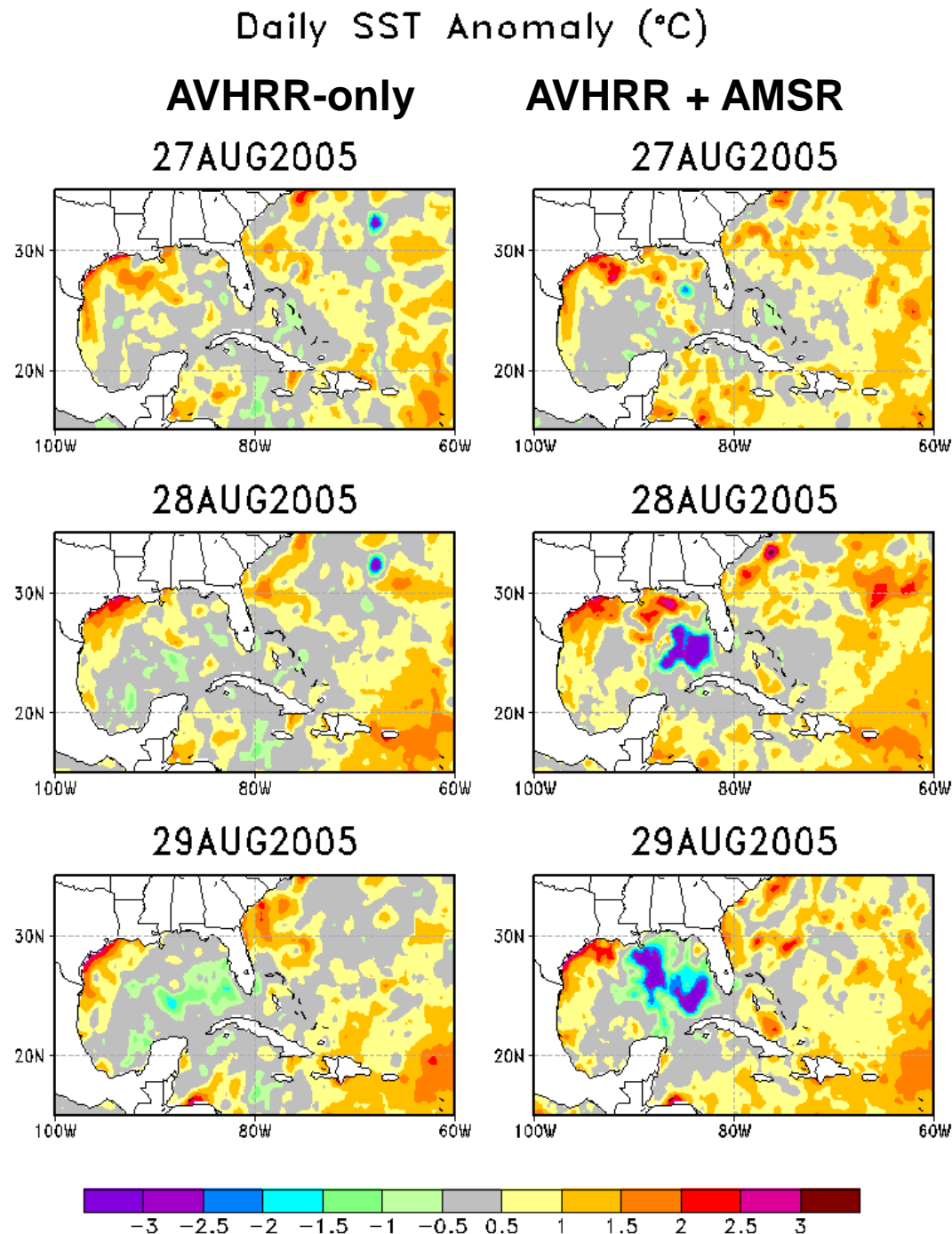
- AVHRR-only: AVHRR + In Situ Data
  - September 1981 - present
- AMSR+AVHRR: AMSR + AVHRR + In Situ Data
  - June 2002 - present
- Real time: Interim (1 day of data)
- Delayed (2 weeks): Final (3 days of data)
- Ship SSTs corrected using buoy SSTs
- Satellite SSTs corrected using buoy SSTs and corrected ship SSTs



# Daily OI SST Anomalies

Left: AVHRR-only OI  
Right: AVHRR+AMSR OI

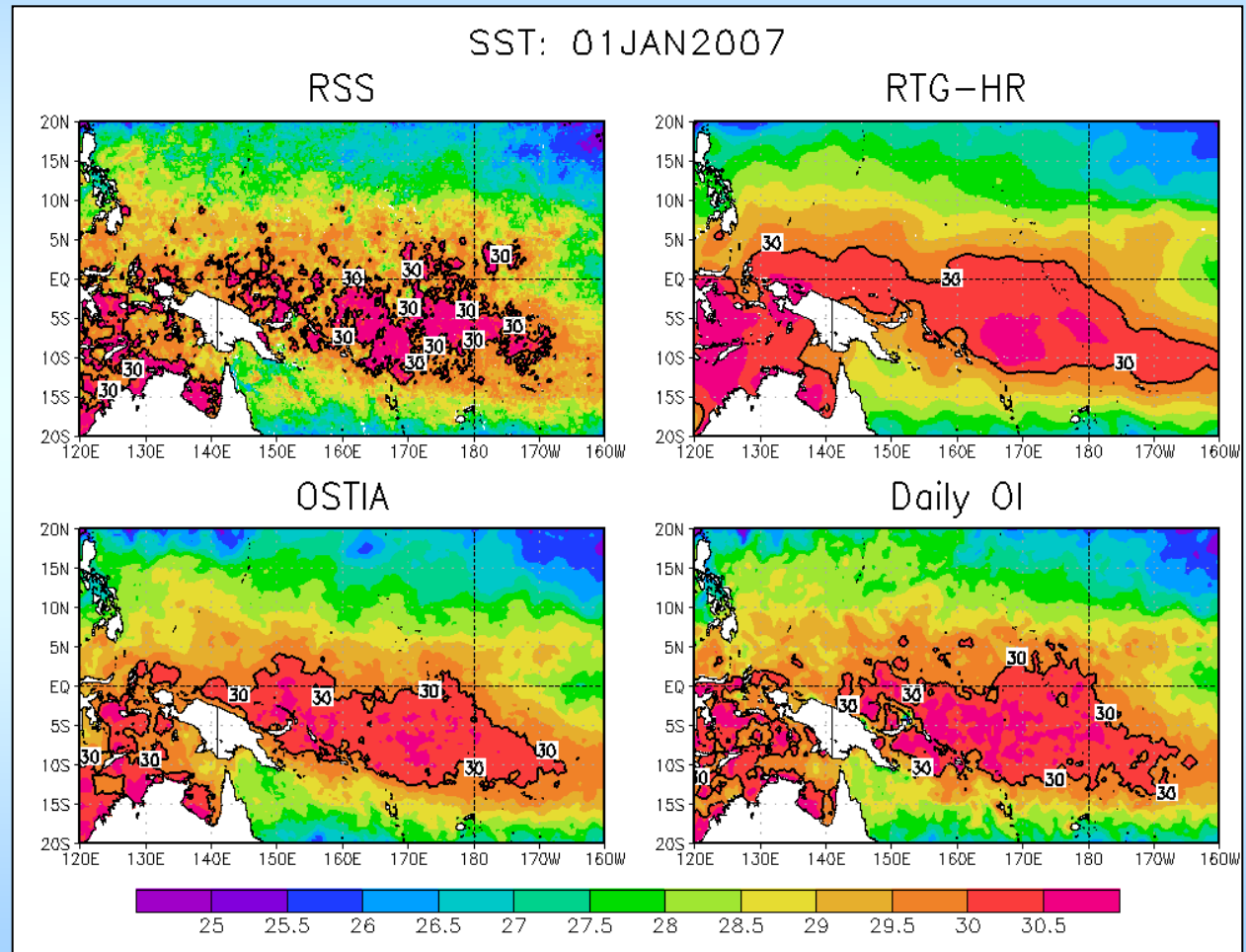
- **27 August: Katrina**
  - Weak anomaly in Gulf in AVHRR+AMSR
- **28 August: Katrina**
  - Strong anomaly in AVHRR+AMSR
- **29 August: Katrina**
  - Strong anomaly in AVHRR+AMSR
  - Modest anomaly in AVHRR-only



# SST Analyses, 1 January 2007

- RSS OI
  - (~1/11) grid
- NCEP RTG-HR
  - (1/12) grid
- UK OSTIA
  - (1/20) grid
- NCDC Daily OI:  
(AMSR + AVHRR)
  - (1/4) grid

- **This is a daily average**
  - What spatial scales are justified?



# Daily OI Version 2

## ■ Looking Forward

- Add higher resolution daily OI with ~ 5 km spatial resolution
- For a first guess: Use the 1/4° daily AMSR+AVHRR OI from the current day + strongly damped high resolution analysis from the previous day
- June 2002 - present

# Analysis in Two Stages

4 km IR Daily OI

Hi Res Data:  
IR

Hi-Res Product  
(t-1)

Strong  
Damping  
First  
Guess (t)

Hi-Res Product (t)

Low-Res Product  
(t-1)

Weak Damping  
First Guess (t)

Low-Res Product (t)

1/4° AMSR+AVHRR Daily OI

Low Res  
Data: IR,  
MW, Situ

# Results/Accomplishments (for both SST analyses)

- Programs and scripts are run quasi-operationally via cron jobs and are stable
  - We only have problems when data from outside NCDC is delayed or missing
  - Flow charts of the processing are done
- Scientific papers published for both
  - More in press
- Web pages established
  - Analyses available for download

# Validation Strategy/Results (for both SST analyses)

- Intercomparisons carried out with other analyses
  - ERSST with HadISST, etc.
  - Daily OI with other GHRSSST (Group for High Resolution SST) products
- Error estimates computed along with SST fields

# Issues/Risks & Work- Off Plans (for both SST analyses)

- **Analyses are only quasi-operational**
  - Thus, if current programmer not available other programmers do not have complete access to produce analyses and archive them
  - Input data sets not all operational
    - AMSR data from Remote Sensing Systems
  - Documentation not complete
- **Product Maturity**
  - Level 5 out of 6

# Schedule Research- to- Operations

## ■ Documentation

- Complete documentation of codes, scripts, products, data formats, etc.
- Complete/modify Submission Agreement with archive
- Update product description on the NCDC CDR web pages



# Schedule: Research- to- Operations

- **Transfer of code from research to operations**
  - Create a user guide
  - Rewrite code/scripts to adhere to operational requirements
  - Implement operational control of input data sets
  - Include additional diagnostic and flow-control code
  - Install code in production environment

# Resources

- **Number of personnel employed for project**
  - 1.5 scientist
  - 1 programmer (need more)
- **Key equipment**
  - Linux/Unix computer with access to data servers
- **Key collaborating projects or personnel**
  - NOAA/NWS/CPC, NOAA/OAR, & NOAA/NESDIS/STAR
  - GHR SST (Group for High Resolution SST)
  - Oregon State - Dudley Chelton
  - UK Met Office - Nick Rayner
- **Target NOAA Data Center**
  - NCDC