AGU Spring Meeting

A05:Sea Surface Temperatures: Significance and Measurement
Convener: S. Fred Singer

Description: Oceans cover 71% of Earth's surface and control global climate. Global temperatures are really SST. Current controversy revolves around disparities in the tropics and SH between temperature trends of the atmosphere and surface (essentially SST).

Accurate measurement of SST is difficult. Geographic coverage is poor and there are many techniques, each with its own problems and uncertainties: water temperatures with buckets and at ship engine inlets; fixed and floating buoys; satellites using IR and microwaves; air temperatures from shipboard and island stations.

Analyses of SST with Uncertainty Estimates

Thomas M. Smith and Richard W. Reynolds

- Paper submitted to Singer's AGU session to provide balance response. The results are:
  - The tendencies of large-scale 20th century SST changes are detectable
  - Because of errors, there is uncertainty in the magnitudes of the changes
  - More averaging further reduces errors, and low-frequency tendencies are more reliable


GHRSST-PP
GODAE High Resolution Sea Surface Temperature Pilot Project
7th GHRSST-PP Science Team Meeting
Craig Donlon, Director
Boulder Colorado, USA, 27th March 2006
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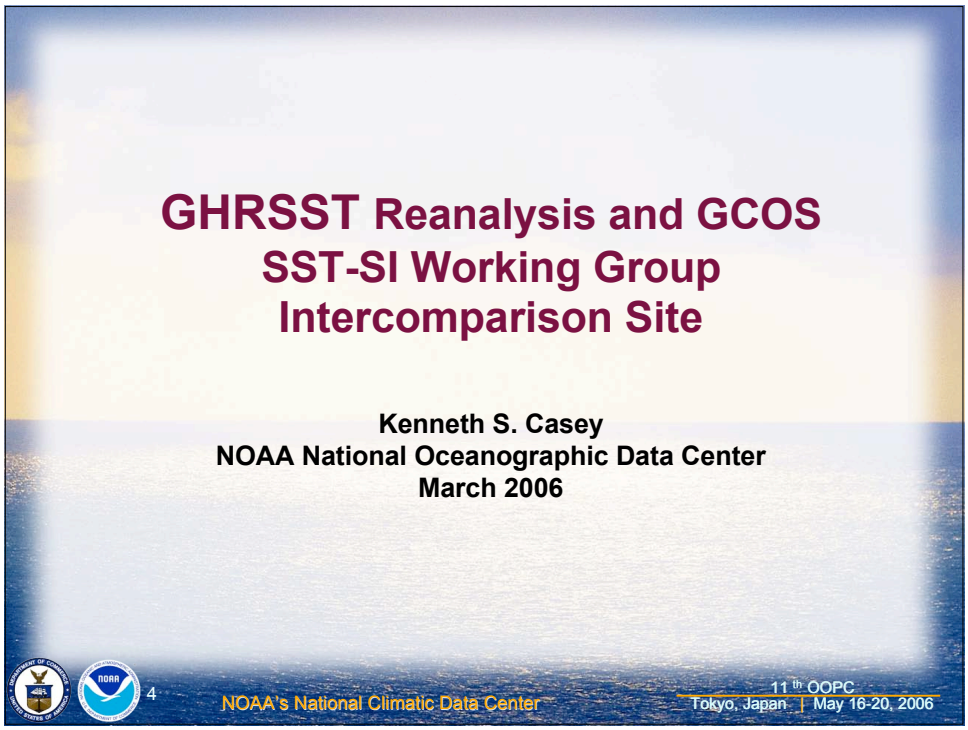
NOAA's National Climatic Data Center
11th OOPC
Tokyo, Japan | May 16-20, 2006


GHRSST Reanalysis and GCOS SST-SI Working Group Intercomparison Site
Kenneth S. Casey
NOAA National Oceanographic Data Center
March 2006
4
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Datasets

In hand:

- AVHRR Pathfinder Version 5
- Operational AVHRR
- HadSST2
- OISSTv2

On weekly, one-degree grid, with day and night separates for all but OISSTv2

All in common format (Matlab for now, but could be netCDF, HDF4-SDS, etc.)

Ongoing and Future Activities

- Get all datasets online in variety of formats
- Establish standards for intercomparison
  - Grids
  - Color scales
  - Basic comparisons
- Link to higher resolution SST intercomparisons
- Connections to sea ice…
- Live Access Server, TDS, etc.

(A)ATSR Re-analysis for Climate

(A)RC

Chris Merchant (Edinburgh)
David Llewellyn-Jones (Leicester)
Nick Rayner (Hadley Centre)
Roger Saunders (Met Office)
Liz Kent (Southampton)

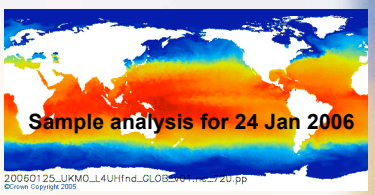
Strategy for accuracy & stability

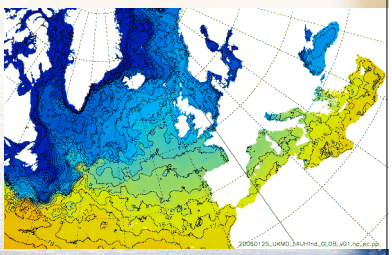
1. Using radiative transfer, refine SST retrievals independently of *in situ* measurements until
   - global bias <0.1 K
   - minimize geographic variation in bias
2. Correct for residual global bias using subset of "best" *in situ* SSTs as reference
   - minimal loss of independence
   - basis for long-term stability

Operational SST & Sea Ice Analysis

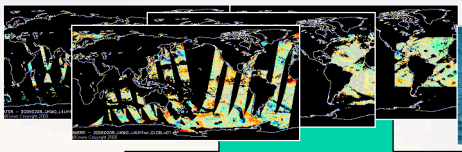
John Stark, Craig Donlon: UK Met Office

- Daily 1/20° (~5km) global analysis using optimal interpolation.
- Using satellite (microwave & IR) and in situ data.
- Now running daily on a pre-operational test phase.
- Persistence based; No explicit model.
- Analysis results available from www.ghrsst-pp.org
- Aim to become a fully operational system in Mid-2006.
- Uses sea ice analysis performed by OSI-SAF (met.no / DMI).





Basic Architecture



Data Sources

Quality Control
-Background check -Diurnal warming flagging

Satellite Bias Estimation
-Find match-ups -O.I. estimate.

O.I. Analysis
-Using 2 background error scales
-Spatially varying errors

Anomaly Persistence Forecast
With relaxation to climatology

NSIDC: Sea Ice Products

Florence Fetterer

- About 40 in all
- About 18 updated regularly
- About 7 of these are produced in house
- http://nsidc.org/data/sea ice/


Passive microwave sea ice concentration


Ancillary sea ice products


Visible and infrared sea ice products


Field observations


Other passive microwave sea ice products


List of all sea ice products

Satellite Passive Microwave for Sea Ice

- The Positives
  - Long record (ESMR, 1972-77; SSMR,SSM/I,SSM/IS; 1978-present; AMSR, 2002-2008;….and going into the future, SSMIS,CMIS, ESA Sensors?…)
  - Not (much) affected by atmosphere
  - Easy to process, near complete spatial and temporal coverage
  - Almost 30 years of algorithm research
- The Negatives
  - Poor resolution, compared with visible, IR, and SAR
  - Underestimates ice concentration – seasonally dependant bias
  - Most products smear out the real ice edge, or fail to detect it if there is a wide MIZ (~75 km resolution of the 19 GHz channel)

GCOS SST&SI working group
Meeting of the sea ice subgroup

Søren Andersen
Center for Ocean and Ice
DMI Copenhagen

Outcome of the meeting

- Assemble inventories of passive microwave and ice chart data sets
- Develop plans for 1) inter-comparisons and; 2) validation
- Develop standards for error estimates and encourage their inclusion in data sets
- Define methodologies for conversion/handling of GIS format ice charts
- Engage the ice charting community (IICWG) to encourage investigations of chart uncertainties and temporal/spatial variations in detail and quality
- Encourage the support for ASPeCt analyses and data bases of sea ice thickness and other sea ice properties from ship records and ice charts. Extend to Arctic.
- Encourage systematic reporting (GTS) of sea ice conditions from ship expeditions in polar regions, inspired by ASPeCt (JCOMM).
- Monitor definition of accuracy/adequacy requirements in ICOS