

## Uncertainties in SST and Sea Ice Analyses

#### And the work of the GCOS SST and sea ice Working Group

Nick Rayner, Third WCRP International Conference on Reanalysis, 31<sup>st</sup> January 2008



### Introduction

The GCOS SST and sea ice Working Group



### Collaborators

- The other members of the GCOS SST & SI WG are:
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- Those highlighted in bold contributed material for this presentation, as did **Dudley Chelton** and **John Kennedy**



This presentation covers the following areas

- Introduction
- Biases
- Inhomogeneities
- Sampling and measurement error
- Temporal and spatial resolution
- Choice of analysis technique
- GCOS SST/SI WG plans



# SST: sampling and measurement error

Estimate of % of 5° weekly gridboxes with SST uncertainty < 0.5°C in 2006 from ICOADS





National Oceanography Centre, Southampton UNIVERSITY OF SOUTHAMPTON AND NATURAL ENVIRONMENT RESEARCH COUNCIL

Courtesy of Liz Kent



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Courtesy of John Kennedy



# SST: spatial and temporal resolution

- Weekly OI.v2 (1°)
- Daily OI (1/4°)
- OSTIA (1/20°)
- RTG-HD (1/12°)







# SST: analysis technique

NATIONAL OCEANIC AND

 RSST.v3 anomaly (new) stronger than ERSST.v2 (old) in early period

> Less damping in new analysis



60S-60N Recon Annual SSTA

00 1970 1990 1990 1900 1910 1920 1930 1940 1930 1960 1970 1980 19

ERSST.v2 RSST.v3 Had



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1933

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Please ask me about the Antarctic later

2004

1978



# Sea ice: spatial and temporal sampling and methodology

Tiepoint uncertainty (%) Concentration std dev (%) Atmosph. effects s.d. (%)















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Andersen et al, 2007, JGR, 112



## GCOS WG plans

- In order to "record and evaluate the differences among historical and near real time SST and SST/SI analyses and identify the sources of differences in the analyses "
  - SST analyses are being assembled
  - Initial basic intercomparisons will be done by May
  - Results will be discussed and published at CLIMAR3 meeting
  - Participation will then be invited by other groups and further analyses gathered
- A website is being set up by NODC to host the data and intercomparisons



### Questions and answers

How can we help you achieve your objectives?



### Data Anomalies: 11 Jan 2003 Differences lead to day-to-day noise in OI

 AVHRR day & night

- Note data scarcity
- Pathfinder: local time
- AMSR day & night
  - Note swath width & precipitation
  - Day night differences not always diurnal warming









## SST: analysis technique

- LF difference
  - $|ERSST-HadISST| \leq 0.05^{\circ}C$
  - RMSD =  $0.02^{\circ}C$
  - overall similar climate variation
  - Kaplan slightly more damped
- **ICOADS** differences
  - Cooler early (1901-1930)
  - Warmer after 1980
  - Both analyses may be damping LF anomalies





Courtesy of Tom Smith





## Sea ice: inhomogeneities (Antarctic)





1978

1955 1961



2004

1898

### Sea ice: analysis technique

Met Office Hadley Centre

Concentration anomalies for 2000-1 Red: -ve Green: +ve

Highlights spatial variability



#### Andersen et al, 2007, JGR, 112