GHRSST-XVII ESI breakout Report

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17th GHRSST Science Team Meeting, 6th-10th June 2016, Washinton DC, USA

Ship-borne SST Radiometer Network
Werenfrid Wimmer (NOCS)

- Motivation: Regions covered by different teams complement each other to achieve effective global coverage

- Membership: Any person or group who use instruments or who wish to use the radiometer SSTskin data

Radiometer Inter-comparison Workshops

- Previous SST radiometer inter-comparison workshop was Miami 2009 (3rd in series)

- FRM4STS – NPL (UK) June 2016

- FRM4STS – ICE inter-comparison Mar-Apr 2016, Greenland

- ISAR – SISTeR data on Queen Mary II, 11 Sep 2015 to 6 Nov 2015 SISTeR side-by-side comparison

Data Format

- L2r document will come out later in 2016
  - Just for radiometers not all in-situ
- L2r format includes uncertainties
  - Random, systematic, instrument uncertainty, quality_level
- data hosting at CEDA (RAL) and/or IFREMER (Felyx)
  - Wiki, user forum
    - Exchange experiences
  - web page: http://isrn.rl.ac.uk/home.shtml

Discussion

- Boris Petrenko: What is the mathematical basis for this Radiometer uncertainty estimation
- Wimmer: You need to understand your instrument. I have done it for ISAR.
- Random error is standard deviation
- You have to analyse the components of your instrument. You need to go back to first principles. You can use the manufacturers' specifications.
- Peter Minnett: It goes back to the "Guide For Uncertainties" – French Bureau of Measurement

How do we make the most of sparsely observed ship SSTskin measurements?

- Listed the various planned cruises with SSTskin radiometers installed – Southern Ocean will be well-covered during summer months. Tropics slightly less well covered. Where is RV Investigator going over coming 12 months.

- Data Dissemination: RAL data portal for now (SiSTeR and Fred's ISAR data go there). Peter Minnett willing to provide SSTskin data.

- GTS? Not suitable for SSTskin as it is only available with sufficient accuracy in delayed mode. Also, we need it to be an independent validation source for satellite SST products.

Use of SSES in L4

- Do they help (how do we know if they help)?

Bruce McKenzie: At NAVO for ocean model we currently assume errors are uncorrelated but it would be useful for us to have information about correlation of errors.

Jon Mittaz: In CCI we have a project to determine error correlation.

Alexey Kaplan: In G16 Jonah Roberts-Jones suggested an experiment.

Bob Grumbine: In the RTG (using 4DVAR) the sses_bias correction is essential.

Beggs: For RAMSSA/GAMSSA we apply sses_bias correction and calculate a standard deviation for each satellite data stream (by platform) using matchups with buoys over a time period. This is then used to weight each data stream ingested into the OI system.

Alexey: Perhaps we could make a case for necessity of SSES in L4 by showing how inconsistent SST values and their uncertainty estimates across products. E.g. for 2 L4 data sets, we should step back and first do pairwise analyses sysematically, summarise them, and then discuss our uncertainty estimation procedures and how they should be changed?

Use of SSES in L4 cont.

- Are there issues?

- How can their utility be improved?

Methods for SSES Validation

- How do we verify SSES methods?
- Jon Mittaz: Within CCI the verification shows us whether our uncertainty model is correct.
- Beggs: Some groups (like CCI and ABoM) use a model to determine SSES and others use empirical MDBs to derive them. The important thing is not to only use drifting buoys to derive SSES and to validate them.
- Alexai: To estimate uncertainty in satellite SST

Methods for SSES Production

- Are some methods better than others?

- Is convergence necessary/desirable/possible?

- Inconsistency, particularly SSTskin vs SSTdepth after application of SSES bias

Compositing L2P to L3
Chris Griffin (ABoM)

- Quality information in L2P files:
  - SSES – parametric
  - quality_level – q – non parametric
- Is there enough information in this framework?
  - Which sses_bias and sses_standard_deviation are the most reliable?
  - We don't have degrees of freedom – is there sufficient information in the L2P file?
  - Uncorrelated errors -> correlated errors. Spatial, temporal, (in situ, sat)
  - Quality Level does not change over time. If QL does degrade over time then we should change it.

Discussion

- Jon Mittaz: In CCI we add in error components that hope to reflect the average NWP state.

- Andy Harris: Problem with clouds.

- Peter Cornillon: We need to reflect the effect of the atmosphere on SST. Small-scale SST gradients and atmospheric variations.

- Andy Harris: How to construct L3C (multiple swaths) - the GDS2.0 specifies that you should only take the highest quality SST value to go into an L3C grid cell. However, I do not agree with this and needs to be addressed.