

# GODAE High Resolution SST (GHRSSST) In situ and satellite data integration (ISDI) technical advisory group (TAG)

TERMS OF REFERENCE (6<sup>th</sup> September 2002)

## PREAMBLE

The GODAE high resolution sea surface temperature pilot project (GHRSSST-PP) has been established to give international focus and coordination to the development of a new generation of global, multi-sensor, high-resolution, SST products. The most promising way to realize a new generation of SST data products is to combine observations from complementary infrared (IR) and passive microwave (PM) satellite sensors on polar-orbiting and geostationary platforms together with quality controlled in situ observations from ships and buoys. Each of these measurement types has unique benefits but individual limitations and innovative but robust data merging strategies and methods have to be developed that optimise the resolution, coverage, accuracy and temporal characteristics of diverse input data.

**TABLE. 1 : GHRSSST-PP data product specification.**

<b>Characteristic</b>	<b>Merged SST</b>	<b>Analyzed SST</b>	<b>Reanalyzed SST</b>
<b>Grid Size</b>	Better than 10 km	Better than 10 km	Better than 10 km
<b>Temporal resolution</b>	6 hours	12 hours	6 hours
<b>Delivery timescale</b>	Real time	Real time	7-60 days following data reception
<b>Accuracy</b>	< 0.5 K absolute 0.1 K relative	< 0.5 K absolute) 0.1 K relative	< 0.3 K absolute (target), 0.1 K relative
<b>Error statistics</b>	rms. and bias for each input data stream at every grid point	rms. and bias for each output grid point (no input data statistics are retained)	rms. and bias for each output grid point (no input data statistics are retained)
<b>Coverage</b>	Regional (Best effort Global)	Global, (Regional extracted)	Global
<b>SSTskin product</b>	Yes	Yes	Yes
<b>SSTsub-skin product</b>	Yes	Yes	Yes
<b>SST1m product</b>	Yes	Yes	Yes
<b>Cloud mask</b>	For each input data set	Yes	Yes
<b>Confidence data</b>	No	Yes (sea ice information, diurnal warming mask, quality flags)	Yes (sea ice information, diurnal warming mask, quality flags)
<b>Nominal product format</b>	Hdf/GRIB/NetCDF	Hdf/GRIB/NetCDF	Hdf/GRIB/NetCDF

The GHRSSST-PP convened a Workshop in May 2002 to formalise the GHRSSST-PP Implementation Plan. At this meeting the specifications of GHRSSST-PP data products was agreed. Two types of primary GHRSSST-PP SST demonstration products will be produced in real time at GHRSSST-PP Regional Data Assembly Centres (RDAC) and Global Data Analysis Centres (GDAC): Merged products and Analysed products. In all cases data products will provide global coverage, be free from cloud contamination, consider sea ice regions appropriately, provide information on diurnal signals (location, phase and amplitude) and, will be accurate to better than 0.5 K. *Merged products* will be produced at the highest spatial and temporal resolutions possible (nominally every 6 hours) and no interpolation or combined analysis will be performed on these data. They can be thought of as unique grids from the different sensors. Merged products retain all of the error statistics for each input data set that are individually re-gridded, calibrated and processed to skin SST ( $SST_{skin}$ ), sub-skin SST (the SST at the base of the skin temperature gradient layer,  $SST_{sub-skin}$ ) and, SST at 1m ( $SST_{1m}$ ) data products. These products are expected to serve the NWP and ocean modelling community. In

contrast, *analysed products* are derived from the combined analysis of all merged products within a 12 hr window and result in a single analysed SST field of  $SST_{skin}$ ,  $SST_{sub-skin}$  and  $SST_{1m}$  together with error statistics for each grid point. Analysed products are expected to serve the climate and general user community. A summary of GHRSSST-PP data products is provided in Table 1.

The In situ and Satellite Data Integration (ISDI) component of the GHRSSST-PP refers to the operational methodology that will be used to deliver the data products described above. The ISDI is expected to evolve as new research results become available and will be coordinated by the ISDI-TAG answering to the GHRSSST-PP Science Team.

The following Terms of Reference have been agreed for the ISDI-TAG:

- (i) Based on the conclusions of the 2<sup>nd</sup> GHRSSST-PP Workshop, develop a consensus methodology that can be implemented within RDAC and GDAC ISDI providing global coverage  $SST_{skin}$ ,  $SST_{sub-skin}$  and  $SST_{1m}$  merged and analysed data products according to the specification in Table 1.;
- (ii) Work with specific applications of GHRSSST-PP data products and act on any feedback;
- (iii) Form and operate an international panel to undertake the development and implementation of the GDAC and RDAC GHRSSST-PP ISDI, including its final transition into an operational system at a GHRSSST-PP GDAC. This should address (a) merged and analysed data product format (b) product validation protocols based on GHRSSST-PP diagnostic data sets (c) common implementation of the ISDI at the GDAC data product computational facility (DPCF) and within RDAC (e) data archive of GHRSSST-PP data products (d) suitable metrics to assess the performance of the GHRSSST-PP products and ISDI;
- (iv) Review and assess proposals for improvements to the ISDI methodology and decide if and how such improvements should be incorporated into the operational ISDI;
- (v) To work together with GHRSSST-PP users and report on the progress of User Applications and Services (AUS) activities using GHRSSST-PP data products;
- (vi) Review and assess user applications for experiments to be executed at the GHRSSST-PP GDAC DPCF;
- (vii) Provide scientific guidance to, and as appropriate, receive advice from, the GHRSSST-PP Science Team on the scientific and technical issues associated with the implementation and operation of the ISDI and on the use of GHRSSST-PP products by GODAE and other users;
- (viii) Provide advice and guidance on scientific and technical innovations relevant to the GHRSSST-PP;
- (ix) Provide regular reports on progress to the GHRSSST-PP Science Team.

#### **ISDI technical advisory group (June 2002)**

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**Technical areas to be added at a later date (no later than December 2002):**

Sea Ice  
Computer and operationalisation  
User applications