A New Generation of Sea Surface Temperature Products
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Introduction
A new generation of integrated SST Data Products and Services is being delivered to user communities in all over the world every day. The Global Ocean Data Assimilation Experiment (GODAE) High Resolution Sea Surface Temperature Pilot Project (GHRSSST-PP) has developed and now operates an internationally distributed system that delivers high-resolution (better than 10 km) global coverage SST data products in a real time (~6 hourly). Innovative data fusion methods and algorithms are implemented in an operationally robust manner based on complementary satellite and in situ SST observations that capitalise on synergy benefits. Within GHRSSST-PP, SST Climate Data Records (CDR) will also be generated by a dedicated re-analysis activity that will make use of additional delayed mode data sets not available to the operational real-time system. GHRSSST-PP data products and services have been designed to serve the diverse needs of GODAE and in addition the wider scientific community taking into consideration solicited user requirements at all levels. The GHRSSST-PP Regional/Global Task Sharing (R/GTS) system will be transitioned into an operational context during 2005-2008.

GHRSSST-PP L2P format data products are netCDF files containing SST data, error estimates for each pixel (bias error and standard deviation) and a series of ancillary fields to help interpret and use the SST data themselves. The power of L2P lies in the fact that all satellite SST data are presented in a common easy to use data format so that only a single utility is required to start using data - rather than having to write and maintain code for ingestion of different satellite products. The ancillary fields provide users with a suite of dynamic flags that can be used to filter data based on criteria tuned to a particular application. For example, if data contaminated by diurnal warming are unwanted then surface wind speed and solar radiation auxiliary fields can be used to flag data at low wind speeds with high solar radiation. For IR SST data, aerosol optical depth can be used to filter data suspect due to contamination. Sea ice concentration limits can be set to mask suspect data.

The Regional/Global Task Sharing Framework. A distributed processing system has been adopted in which all data processing operations are shared by Regional Data Assembly Centres (RDAC). RDAC systems ingest, quality control and merge satellite and in situ SST data sources to generate regional and global coverage L2P data products using the same processing procedures. RDAC data products are served to the local/regional user communities and passed to a GHRSSST-PP Global Data Analysis Centre (GDAC) where they are integrated together with other RDAC centre data. L2P products are also analysed to provide L4 global coverage combined analysis products at both GDAC and RDAC centres. All data products are supported by user services tailored to both operational and scientific user requirements.

All products are maintained on-line for a 30 day period at the GHRSSST-PP JPL GDA located at http://ghrsst-jpl.nasa.gov before being passed to a Long Term data Stewardship and Reanalysis Facility (LTSRF) for delayed mode processing to Climate Data Record status.

Use of ENVISAT AATSR within GHRSSST-PP. L4 products capitalise on the synergy benefits of using in situ, microwave satellite SST and infra-red satellite SST. Bias correction of all input data to the analysis procedure is critical to obtaining a valid output and L2P. In addition, bias due to diurnal stratification and cool skin effects must also be accounted for using additional data. The ENVISAT AATSR provides an extremely stable high quality data source that can be used as a reference for all other satellite sensors using in-situ buoys as an independent verification. The AATSR provides better coverage and arguably, a more accurate data set than in-situ, based on a single extremely accurate on-board calibration and unique dual view capability. The EU GHRSSST-PP RDAC (Medspiration) is currently processing global coverage L2P data sets from the AATSR in real time. There are a variety of operational L4 SST analysis products available every day within the GHRSSST-PP provided by different agencies. Some systems use only a limited number of satellite inputs (e.g., 1º global Reynolds OIv2 relies only on infrared data) whereas others try to blend data from complementary sources such as the Met Office 1/20º (~5km) NCOF-OSTIA analysis shown above. As GHRSSST-PP evolves, so will the quality of L4 products.

See http://www.ghrsst-pp.org and access data today!