

GOSUD: GLOBAL OCEAN SURFACE UNDERWAY DATA PILOT PROJECT

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1ST STEP: COLLECT AND DISTRIBUTE SEA SURFACE SALINITY DATA AT A GLOBAL LEVEL

1. INTRODUCTION

The Global Ocean Surface Underway Data (GOSUD) Pilot Project is under the auspices of the IODE – Intergovernmental Oceanographic Data and Information Exchange Committee of UNESCO. GOSUD's goal is to provide an end-to-end system for surface data collected by ships at sea.

2. OBJECTIVES

The main objective of GOSUD is to collect, process, archive and disseminate in real-time and delayed mode, sea surface salinity and other variables collected underway, by research and voluntary-observing ships. During the first phase of the Project from 2001 to 2009, the GOSUD's priority has been on the collection of Sea Surface Salinity (SSS) data, along with collocated sea surface temperature whenever possible.

3. DATA CIRCULATION AND DATA SOURCES

The data reach the GOSUD database by various means and with different levels of quality: 1) Sea surface temperature and salinity are extracted from the Global Telecommunications Systems (GTS), the world-wide data exchange network of the national meteorological agencies, 2) A number of the ship operators submit their data directly to GOSUD; and 3) Scientific observatories, which are part of the project, contribute by providing validated datasets. The datasets that are submitted to the Project either after a scientific validation or after a quality control performed at the level of a data center are of higher quality than the data that are submitted automatically through the GTS. The main reasons are: 1. Higher spatial resolution, 2. Better knowledge of the metadata, 3. Knowledge of the conditions of acquisition (i.e., calibration coefficients, availability of water samples, etc.), and 4. Scientific or data center validation.

4. DATA CONTRIBUTORS

Data extracted from the GTS: An important contribution to the project comes from the data collected on voluntary-observing ships of the SeaKeepers Society. However, SeaKeepers submits their data via the GTS and this may be the reason for the lack of metadata.

The SSS data that the World Oceanographic Circulation Experiment (WOCE) collected has been integrated in the GOSUD dataset as the source of historical data.

Contribution from scientific observatories: The major data set that is directly provided to GOSUD comes from the (ORE-SSS) [4]. Data submitted with a scientific scrutinizing will be of a higher quality when elaborating the delayed mode data set.

Direct transmission: In the frame of the Coriolis project, the thermosalinograph data collected on board the French oceanographic vessels are sent on a daily basis to the GOSUD Global Data Assembly Center (GDAC). Thermosalinograph data collected aboard the NOAA vessels and FerryBox data – contribution of NOCS – have been submitted to the Project and are in the process of being integrated in the GOSUD database.

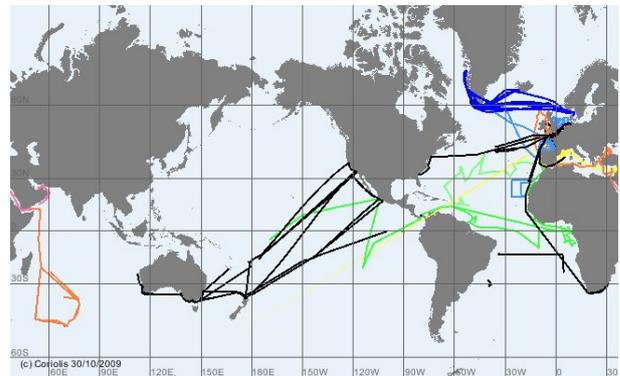


Figure 1. The GOSUD network: 14 ships (August 2003-August 2004)

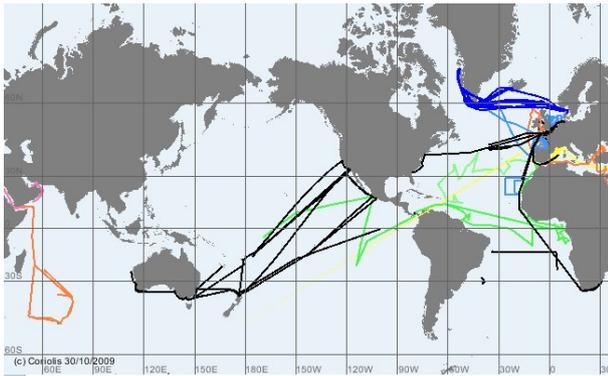


Figure 2. The GOSUD network: 73 ships
(August 2008-August 2009)

5. DATA AVAILABILITY

The data that are centralized in the GOSUD database [1] are distributed by the GOSUD GDAC [2] for scientific studies and are used for validation of ocean models. In addition, NOAA's U.S. National Oceanographic Data Center mirrors the GOSUD data set and they serve the data set via OPeNDAP [3]. The GDAC provides two main facilities to access the data: 1. An FTP site where the data are ordered by year and contributing vessels and made available in the GOSUD netCDF format, and 2. A web site where the data can be downloaded either in netCDF or in ASCII formats.

6. DATA QUALITY AND DELAYED MODE DATA

Most of the GOSUD dataset consists of near real-time data. Near real-time data are data that have been submitted to the GDAC either in low resolution or that have not been passed to a process that enhance the quality of the data (i.e., take into account coefficients of calibration or water samples when existing). They may have been transmitted to the GDAC either immediately after data collection or after the end of the cruises.

IRD – with a contribution of IFREMER and CNRS – has developed a procedure and a corresponding Matlab tool that allows a user to deliver a delayed mode data set taking into account near-real time data, calibration coefficients of the instruments and water samples analysis.

7. DATA USERS

Three main classes of users:

Operational oceanography: For the moment, SSS data are mainly used for validation purposes. Some related studies have been undertaken: study of the vertical variability of SSS, better understanding of the vertical differences within the upper-ten meters of the ocean in order to link the vertical profiles measurements to the surface data.

Scientific studies: SSS variability and trends in the tropical Pacific, elaborating a Sea Surface Temperature and Salinity climatology, vertical and horizontal structure of the SSS, global SSS variability.

Validation of future satellite observations: In the very near future, GOSUD's SSS data will be a major contributor to validation of the SSS data to be collected by the SMOS (European Space Agency) and Aquarius (USA and Argentina) satellites. They will be respectively launched during autumn 2009 and 2010. The underway data is an important contribution because of the information it provides about the horizontal variability of temperature and salinity in the near surface. This, used in conjunction with vertical profile data, will allow researchers to evaluate how well the satellite measurements relate to the distribution of SSS.

8. REFERENCES

- [1] <http://www.gosud.org>
- [2] <http://www.ifremer.fr/gosud/gdac.htm>
- [3] <http://data.nodc.noaa.gov/iode/gosud/> and <http://data.nodc.noaa.gov/pendap/iode/gosud/>
- [4] "Monitoring Sea Surface Salinity in the Global Ocean from Ships of Opportunity" Delcroix et al. OceanObs'09 (Topic 03C Session A4 in situ)

