GOSUD
Global Ocean Surface Underway Data

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Outlines

- Background and history
- Gosud present actors
- Vocabulary and community Gosud is adressing
- Project status
- QC tool
- On going work
- Further information

Background

- XVI° session of IODE (2000) adopted recommendation IODE XVI.10 establishing the Underway Sea Surface Salinity Data archive Pilot Project and its steering group
- GOSUD: the project addresses Sea Surface data collected by vessels (research vessels, merchant ships and others) when they are underway
- Main focus has been put on Sea Surface Salinity and the Project is also supposed to address other parameters

History

- During the first years of the Project, the main effort was focused on data collection from various sources (see details further)
- It was possible to identify which partners were the core contributors to GOSUD

GOSUD: present actors (1)

- As data providers:
  - IRD –France- as lead of SO SSS (10 merchant ships and 35 years of history / experience).

    http://www.legos.obs-mip.fr/observations/sss/
  - NOAA as coordinator of data acquisition on board the US Research vessels
  - Ifremer / SHOM / IRD / IPEV as members of the Coriolis consortium and as coordinators of routine data acquisition on board the 13 french research vessels (some of them cruise in coastal areas)
  - Belgium and Spain . 2 research vessels
  - Less identified contributors that insert their TSG surface data on the GTS
  - Japan (VOS Nippon association) which provides data on a regular basis (2 vessels) in near real time
  - Sporadic contributors

GOSUD: present actors (2)

- As contributors to data management:
  - Ifremer / Coriolis as host of the GDAC
  - US-NODC as GDAC back up
  - IRD & Ifremer (LPO) for definition of QC procedures
  - IRD & Ifremer (LPO) for delayed mode data set elaboration
  - IRD as developer of QC software for elaboration of delayed mode datasets (TSG-QC)
  - "IRD& SO-SSS for derived research products (SSS gridded fields)

Some vocabulary / definitions

- Real-time: data transmitted on a daily basis
  - Aims:
    - Monitor the data collection
    - Instrument monitoring in order to minimize data loss
    - Operational oceanography
    - Ensure the data reach a data centre
    - Identify potential data providers (GTS)
- Near real-time: data transmitted within 30 days
  - Aims:
    - Ensure the data reach a data centre if no RT transmission is available
- Delayed mode data: could be a long time after data collection
  - Aims:
    - Provide a high precision scientific quality data set

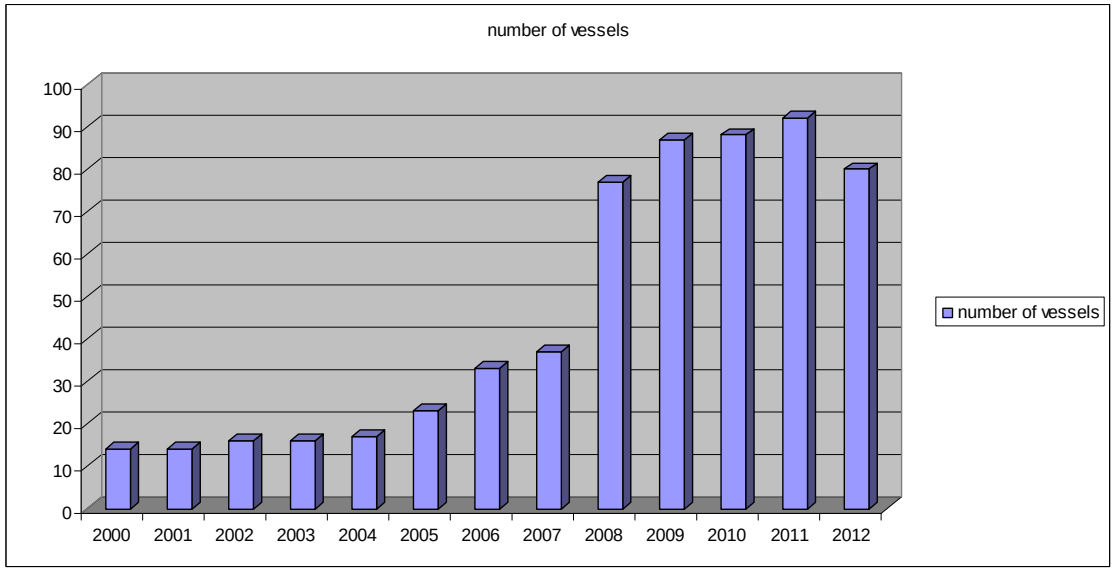
Data quality versus time of delivery

	Quality level not assessable Poor ?	Quality level mid-level	Science Quality
Real time GTS	√ **Metadata may be unknown**		
Real time Direct to GDAC		√	
Near real time		√	
Delayed mode			√

Which users and which community ?

	Meteorological community	**Ship operators (instrument monitoring)**	**Satellite Cal / Val**	**Operational oceanography / modelling**	**Science / research**
Real time GTS	√			√ assimilation	
Real time Direct		√	√	√ assimilation	
Near real time		√	√	√	
Delayed mode			√	√ (validation)	√

Project status



Number of vessels that reported data to GOSUD from 2000 to 2012





Project status: data submission

- Data may reach the GDAC
  - Through the GTS
  - Directly from ships to GDAC
    - French Research vessels,
    - Some other research vessels (Spain,Belgium, ….)
  - From ship operator system to GDAC
    - IRD SSS SO network
    - NOAA vessels
    - VOS NIPPON

Project status: data submission strengths & weaknesses

- Through the GTS
  - ➔ lack of metadata
- Directly from ships to GDAC and from ship operator system to GDAC
  - ➔May be different from one system to another
  - ➔Some of them clearly report accurate meta-data (ie instrument serial number, calibration coefficients, …) some others do not

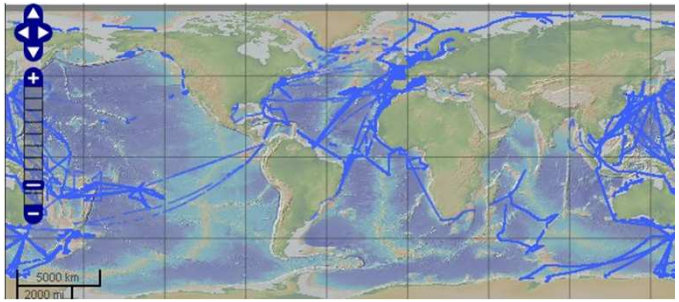
Data submission: ideal requirements

- Direct transmission from ships to GDAC or from ships to ship operator system and then to GDAC
  - Important to have a well identified person to contact and provide feedback
- Real time when possible for assimilation purposes
- A 2-5 minutes median filter applied on salinity with the corresponding temperature measurement
- Metadata well known
  - Ship name or call sign transmitted within the file
  - Intake depth
  - Date of instrument change
  - Serial number and coefficients of calibration
- A proposition of format is available on request

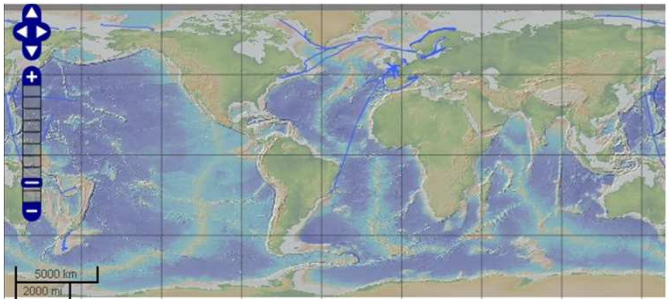
Project status: data delivery

– Data distributed at GDAC level

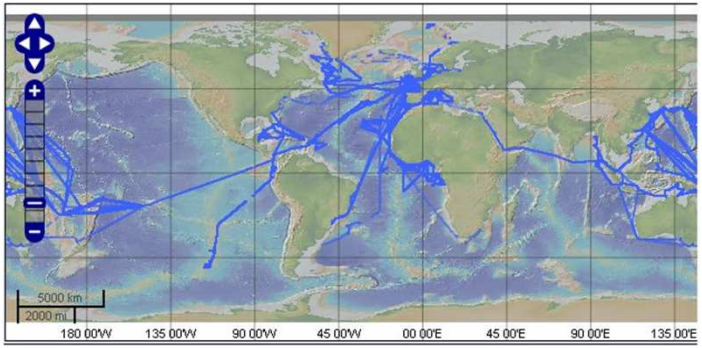
- Web site with a data selection tool



Sept 2012 – Sept 2013



Last 30 days (updated 23 september)



2005

http://www.gosud.org

Data delivery
Web access

Project status: data delivery

– Data distributed at GDAC level

- Through a ftp site http://www.gosud.org Data delivery ftp access

  ftp://ftp.ifremer.fr/ifremer/gosudv2/

  latest directory

  holds both RT and NRT files

  RT ➔ one file / month / vessel

  3ENY2_2010_04_RT_Gosud_V2.nc.gz

  call sign_YYYY_MM_RT

  NRT ➔ one file / year / vessel

  3ENY2_1994_NRT_Gosud_V2.nc.gz

  call sign_YYYY_NRT

Project status: data delivery

- Data distributed at GDAC level
  - Through a ftp site http://www.gosud.org Data delivery ftp access

    ftp://ftp.ifremer.fr/ifremer/gosudv2/

    delayed_mode directory

    DM_FHQB_2003a_TSG.nc

    Call_Sign_YYYYvoyage

    ➔ One file per voyage

    (a voyage is a period of acquisition between 2 harbours or a period between 2 instrument changes within a year for the research vessels)

    New delayed mode datasets have been processed by IRD using their software TSG-QC (Matlab based)

    see http://www.ird.fr/us191/spip.php?article63

data from 21 vessels (20 merchant ships and 1 research vessel) are available from 2002 to 2011 (note that data are not available for all the ships and all the years)

Project status: data delivery

- Data distributed at GDAC back up facility: US-NODC
  - » ftp://ftp.nodc.noaa.gov/pub/data.nodc/iode/gosud/
  - » http://data.nodc.noaa.gov/opendap/iode/gosud/
  - » http://data.nodc.noaa.gov/iode/gosud/

- Gosud SSS dataset is also distributed as contribution to a global in situ dataset gathered in the frame of the EU project MyOcean (http://www.myocean.eu.org)

About delayed mode datasets

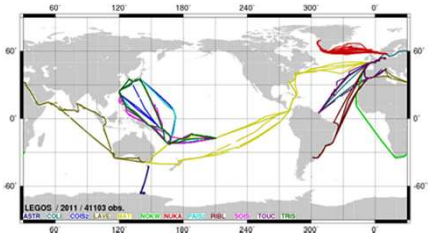
- IRD has developed the TSG-QC software for interactive analysis and validation of underway SSS and SST measurements from a SeaBird TSG
- It enables:
  - Visualisation of TSG variables: Temperature, salinity and ship speed
  - Interactive comparison with climatological values (Levitus)
  - Automatic quality control using selected threshold criteria
  - Data validation and correction with external “bucket” measurements (water samples usually collected once a day) or using collocated Argo data
  - Quantitative estimation of sensor drift

- This open software is freely available on

  http://www.ird.fr/us191/spip.php?article63

SO SSS: Delayed mode TS-QC

Courtesy: Gaël Alory IRD-France-

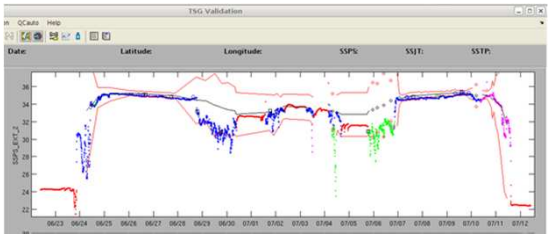


IRD Brest/Nouméa
Atlantic/Pacific

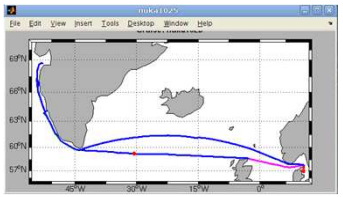
TSG QC ***level 1***: Quality flags

Water sample analysis

Dedicated software: TSGQC



QC flag applied by comparison to climatology SSS/SST. Ship speed, visual check



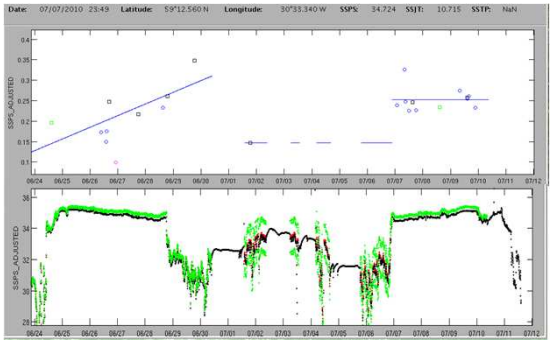
LOCEAN Paris

Colocated Argo Data

LEGOS Toulouse

TSG QC ***level 2***: Data corrected using water samples & Argo data

One file per« voyage » GOSUD V30



Drift and spikes corrections (biofouling, impurities...) using a linear fit or a median filter applied on deviations

SEA SURFACE SALINITY

Observatoire Midi-Pyrénées

LEGOS

IRD Institut de recherche pour le développement

On going work

1) A version 3.0 of the NetCDF format was developped

- It was drawn from V2 and:

- **Harmonises variable names according to CF conventions**
- **Contains in the same file both RT/NRT data and DM data (when processed)**
- **Contains in the same file data and meta data**

- this version 3 as been implemented at the GDAC level (August 2013)

2) New delayed mode dataset elaborated from the data acquired on board french research vessels has been validated and is now available for distribution

3) New delayed mode dataset relative to the merchant ship network led by IRD is also available

4) Integrate the SSS data in the next release the Coriolis dataset for Re-Analysis (CORA) . This dataset presently contains in-situ temperature and salinity profiles from different data types. The latest release CORA3 covers the period 1990 to 2010. « The CORA dataset: validation and diagnostics of in-situ ocean temperature and salinity measurements » C.Cabanes et al.

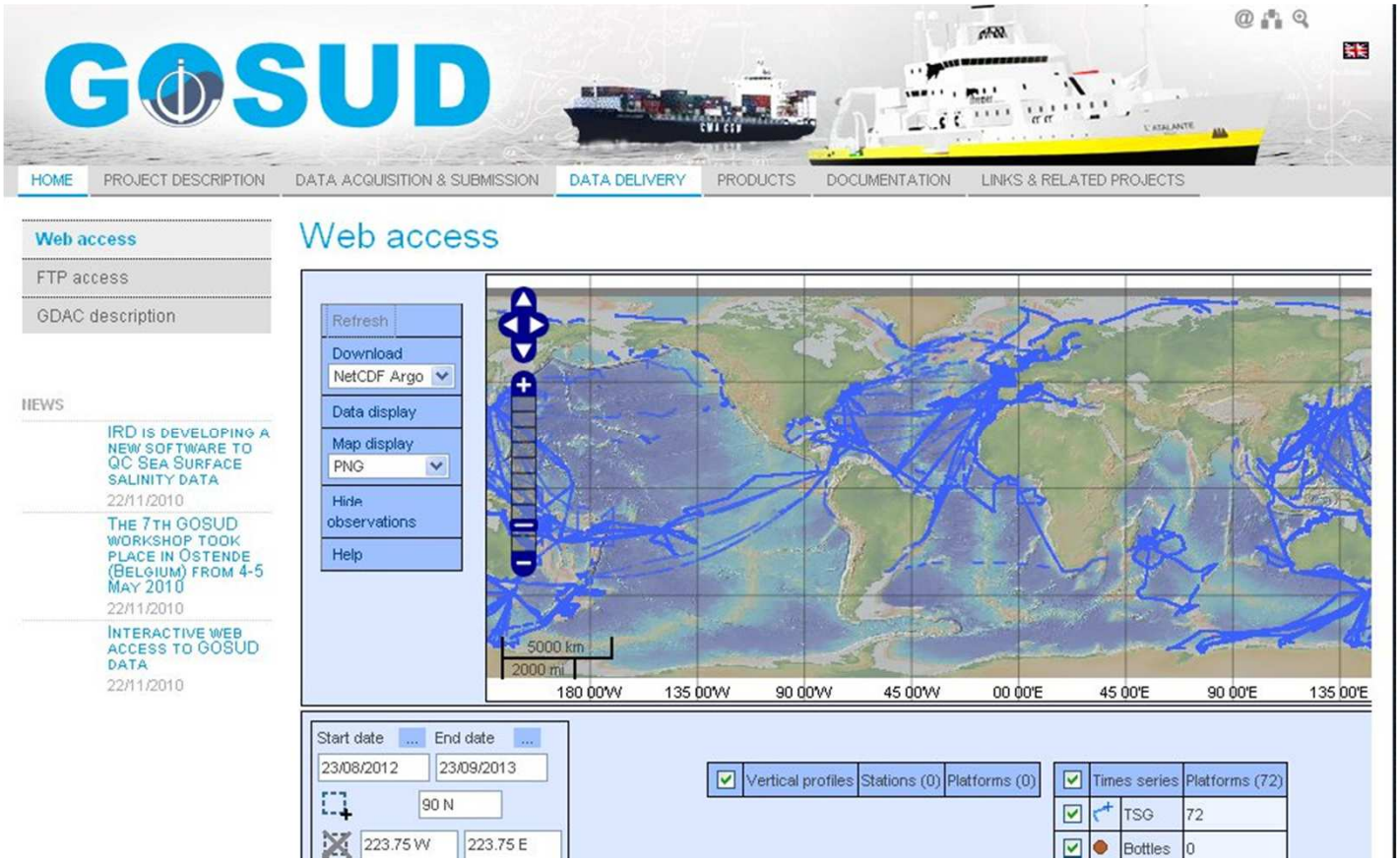
http://dx.doi.org/10.5194/os-9-1-2013

see poster N°14 session N°2. C. Coatanoan & al

Some further information

- In response to NASA's 2013 Announcement of opportunity a letter of intend « Ocean Surface salinity Global calibration / Validation database and environmental parameter space analysis » has been submitted by NOAA and GOSUD has been contacted for support

- As both GTSPP and GOSUD are contributing to GEOSS and complement the global observing system, need to enhance the synergies between the projects and plan to have a joint GTSPP / GOSUD workshop in April 2014 –Oostende, Belgium.



More information on
http://www.gosud.org

Thank you for your attention!
Questions ?