INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

Ad Hoc Session of the Joint IOC-WMO Steering Group on Global Temperature-Salinity Profile Program Hobart, Australia, 12 November 2007

Meeting Report

By Charles Sun

1. Opening of the session

The session opened at 0900 on 12 November 2007 at the Marine and Atmospheric Research Laboratory (CMAR) of Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO). The local host, Ann Thresher, CSIRO, explained the local arrangements. Charles Sun, US National Oceanographic Data Center (NODC), chaired the meeting and welcomed participants (Annex 1).

2. Session arrangements

Charles said that the meeting would have two sessions with a 15 minute-break around 10:30 and adjourn before 12:30 pm. Charles introduced the provisional agenda to the group, noting no changes. The meeting participants adopted the final agenda (Annex 2). Rebecca Cowley (CSIRO) was designated rapporteur.

3. Status of GTSPP – Chair's report

Charles Sun gave the Chair's report. He reported that Bob Keeley has retired from his role in the GTSPP and the SOOPIP (Ship-of-Opportunity Programme Implementation Panel) of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) endorsed Charles as Chairperson of the GTSPP at the 7th session of the SOOPIP at Geneva, Switzerland on 21 April 2007. Charles then continued to discuss the history of the GTSPP, including the four contributing countries (USA, Australia, France and Canada), and the collaborating programs. Charles's presentation is attached in Annex 4 of this report.

4. Review actions from Southampton 2004

The action items from the Southampton meeting were reviewed. Ongoing items will be carried over to the next meeting. The revised action items are in Annex 3.

5. GTSPP data management issues

Susan Wijffels, CSIRO, gave a presentation on XBT corrections. She discussed her paper (in press) on the warm bias found in the XBT dataset. Shallow XBTs have a different error to deep XBTs. She made the paper available for attendees. A batch fall rate calibration is needed. Birgit said that they have batch information back to 1980. Most data does not have batch information. Susan encouraged us to think about strategies for the past and future.

Claudia Schmid of AOML reported that 4 to 5 people could be funded at the fall rate meeting in March 2008, if they present at the meeting.

Ann said that CSIRO have replaced the depths in full resolution casts, rather than applying the linear correction. Charles would like the CSIRO data and a document on how it was QC'd.

6. Cooperation with other programs

6.1. Cooperation with CCHDO

There has been CCHDO and GTSPP cooperation. NODC are developing a 'webcrawler' to pull CCHDO data from the Internet quarterly, while CCDHO's non-public CTD profiles will be pushed to CORIOLIS. This data will be used for DMQC of Argo data.

6.2. Cooperation with Argo

GTSPP monitors floats reporting on the GTS. There have been issues with floats reporting pressure as depth and Charles went through the procedure used to identify these floats. The Argo data centre responsible is then notified that they need to fix depth.

6.3. Cooperation with WOD

Charles reported that there has been a cohesive cooperation between the GTSPP and WOD (World Ocean Database). WOD uses the GTSPP data to update its database every three months. Tim Boyer reported that he has done QC of the GTSPP profile data and needs to find a way to get the data back into GTSPP. He went through the source of additions to WOD since 2005. Tim's presentation is in Annex 5 of this report.

7. Future of GTSPP

Charles reported that NODC are the biggest player in the GTSPP, but funding is limited. He encouraged everyone to involve in the evolution of the GTSPP, including resource sharing. He also encouraged participates to review the GTSPP project plan prepared by Bob Keeley in 2002 as a guide for the GTSPP future improvement.

8. Other business including additional partners should be pursued.

Other business including additional partners should be pursued. The National Marine Data and Information Service of China and the Bundesamt für Seeschifffahrt und Hydrographie (BSH, Federal Maritime and Hydrographic Agency of Germany) accepted Charles' invitation to be the GTSPP Data Assembly Centers

Ms. Fenging Ji of the National Marine Data and Information Service (NMDIS) of China gave a presentation on the GTSPP data management activities in her country (see Annex 6.)

Birgit Klein will check with her colleagues in BSH for submission of delayed-mode XBT to NODC for long-term archive.

9. Next meeting date/place

The next meeting was discussed. Charles proposed 1 or 2 days with short presentations and products of the GTSPP. Later of the week, Charles was able to obtain finical support from the NOAA Argo program office to have a one-day GTSPP workshop in conjunction with the annual Argo data management team meeting in Hawaii.

10. Closing

The Meeting closed at 12:20pm on 12 November with the chair thanking Ann Thresher, Lisa Cowen and Rebecca Cowley for their help.

Annex 1: List of Participants

Boyer, Tim	US NODC	boyer@nodc.noaa.gov
Carval, Thierry	IFREMER	thierry.carval@ifremer.fr
Coatanoan, Christine	IFREMER	Christine.Coatanoan@ifremer.fr
Cowen, Lisa	Australia BOM	l.cowen@bom.gov.au
Cowley, Rebecca	CSIRO Marine Research	Rebecca.Cowley@csiro.au
Gunn, John	ESR	gunn@esr.org
Ji, Fengying	China NMDIS	jfywork@yahoo.com.cn
Klein, Birgit	BSH	birgit.klein@bsh.de
Papij, Alex	CSIRO Marine Research	Alex.Popij@csiro.au
Petit de la Villeon, Loic	IFREMER	petit@ifremer.fr
Piotrowicz, Stephen R.	NOAA	Steve.Piotrowicz@noaa.gov
Reed, Greg	RAN	greg@metoc.gov.au
Rickards, Lesley	BODC	ljr@bodc.ac.uk
Schmid, Claudia	US AOML	Claudia.Schmid@noaa.gov
Sun, Charles	US NODC	Charles.Sun@noaa.gov
Tran, Anh	MEDS	tran@meds-sdmm.dfo-mpo.gc.ca
Thresher, Ann	CSIRO Marine Research	ann.thresher@csiro.au
Xiang, Wenxi	China NMDIS	xwx@mail.nmdis.gov.cn

Annex 2: Meeting Agenda

Ad Hoc Session of the Joint IOC-WMO Steering Group on
Global Temperature-Salinity Profile Program

Final Agenda

Place: CMAR, Hobart, Australia
Time: 0900-1200 12 November 2007

1. Opening of the session
2. Session arrangements
2.1. Adoption of the agenda
2.2. Designation of a rapporteur
2.3. Session time table and discussion papers
3. Status of GTSPP – Chair's report
4. Review actions from Southampton 2004
4.1. GTSPP Southampton 2004 meeting report (discussion paper no. 4.1)
4.2. GTSPP Southampton 2004 meeting action items (discussion paper no. 4.2)
5. GTSPP data management issues
5.1. XBT fall rate (discussion paper no. 5.1)
5.2. Data flow (discussion paper no. 5.2)
6. Cooperation with other programs
6.1. Cooperation with CCHDO (discussion paper no. 6.1)
6.2. Cooperation with Argo
7. Future of GTSPP (discussion paper no. 7)
8. Other business including additional partners should be pursued
9. Next meeting date/place
10. Closing

Annex 3: Revised Southampton Actions

Item	Action	Who	When	Status
1.	Prepare a plan to develop a frequently updated ftp site with a facility to allow users to determine what changes have appeared since the last time they accessed the site.	Sun	1 Dec, 2004	Done.
2.	Australia to complete the scientific review of 1999 data	Cowen	Immediate	done
3.	NODC to determine if data from year 2000 were ready to send to science centres and if so to send them for review	Sun	Immediate	Done
4.	Approach Peter Hacker of APDRC to see if he would be willing to fund the QC of Pacific basin data from year 2000	Keeley	Immediately	Email sent 19 Oct, 2004, Positive response received
5.	Discuss the longer term plans of APDRC and their willingness and ability to perform scientific QC activities for Pacific data for GTSPP	Keeley, Sun	Immediately	Email sent 19 Oct, 2004, Positive response received
6.	Propose that GTSPP gather the global CTD data on behalf of Argo and regularly forward the data to regional centres for their use in the evaluation of Argo data.	Keeley	Immediately	On going. CCHDO is the target.
7.	Australia and AOML to check if duplicates they have detected have been removed from the CMD at NODC and if not to work with NODC to correct the problems.	Gronell, Chong, Sun	next meeting	Chong reports duplicates are properly handled Is OK Done
8.	BODC to notify Sun of its next data submission to WDC-A	Rickards	On submission	done
9.	MEDS and BODC to pursue linking their respective data dictionaries to allow on-line queries.	Rickards, Keeley	April, 2005	Firewall issues prevented a direct connection. MEDS copied BODC's dictionary and inserted records into MEDS'. This is now out of date

				and access capabilities have changed. We need to pursue this through MMI and web services. On going
10.	Follow up on an investigation of why one instance of a real-time and a delayed mode stations appear the same but have different CRCs	Keeley, Hall	April, 2005	Done: 1 BA sent, 2 SEAS files built. BA ==1st SEAS, NODC used 2nd SEAS. Bug produced 2nd SEAS. CRC tag okay.
11.	Determine if the TESACs originating from US operated vessels are being generated within the SEAS2000 software and therefore if they have a CRC tag attached.	Keeley, Cook	1 Jan, 2005	Done: TESACs not generated by SEAS so no CRCs
12.	Australia to insert the CRC value into the delayed mode data submission of 2004 data to NODC	Cowen	Apr, 2005	Done
13.	MEDS and IFREMER to share the software for the CRC calculation and IFREMER to begin implementation.	Keeley, Carval	1 Jan, 2005	Done.
14.	Prepare a report for submission to IODE in April, 2005 to document the success of the CRC tagging scheme.	Keeley, Hall	1 Jan, 2005	Done. NODC will update the report to IODE in March 2009
15.	GTSPP participants who also insert Argo profile data on to the GTS to begin calculating CRC tags and insert them into the Data Centre Identifier field in the Argo netCDF format	All appropriate participants	As soon as reasonable	On going
16.	Provide GTSPP with documentation of the semi-automated QC procedures when available	Gronell	When available	In press. Will sent it to NODC.
17.	Prepare a proposal on the best way to incorporate Argo data into the GTSPP data stream	Sun	1 Dec, 2005	Done
18.	NODC to offer GTSPP data in the Argo netCDF structure	Sun	30 Mar, 2005	On going
19.	Complete 2003 Annual Report for	Keeley,	Jan, 2005,	2003 report

	IODE meeting in April and 2004 report for JCOMM meeting in September	Sun	May, 2005	posted on GTSPP web site
20.	Prepare a letter to go to NODC requesting their cooperation in producing a GTSPP CD	Keeley, Rickards, Chong	1 Dec, 2004	On going
21.	Prepare a draft form of the GTSPP CD to circulate to participants	Sun	1 Dec, 2004	On going
22.	Investigate what QC procedures are offered for oxygen measurements in the JPOTTS book published in about 1990 and report to Keeley.	Rickards	As possible	On going
23.	Cooperate with the ADMT in devising QC procedures for oxygen profiles	Keeley	next meeting	Argo is still sorting this out.
24.	Prepare poster for upcoming IODE meeting in Oostende	Keeley, Petit de la Villeon, Sun	Jan, 2005	Done

Annex 4: Global Temperature – Salinity Profile Program Status Report for 2007 by Charles Sun

Global Temperature – Salinity Profile Program Status Report for 2007

Dr. Charles Sun
US National Oceanographic Data Center
(With contributions from Bob Keeley)

Ad Hoc Meeting on the GTSPP
Hobart, Australia, 12 November 2007

Outline

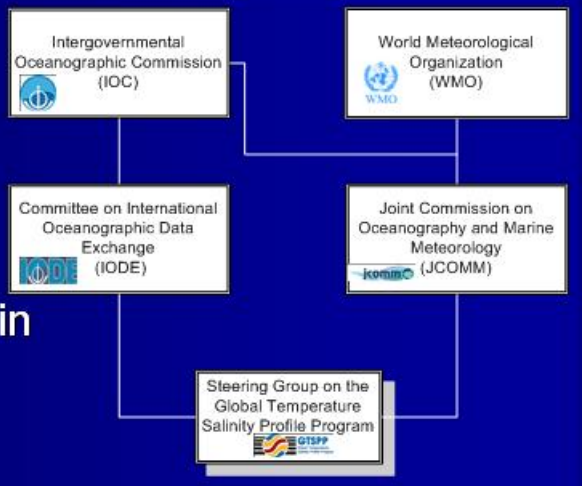
- Some History
- Program Description
- New Developments
- GTSPP Activities at NODC
  - Improved online and offline data deliveries.
  - Improved visual QC software.
  - Evaluate CRC data tag scheme.
  - Collaborations with external partners.
- Concerns
- Future Plans

2

Some History

Objective is to provide improved access to the highest resolution, highest quality data as quickly as possible.

- A joint WMO-IOC program.
- Began as an official IODE pilot project in 1989.
- Went into operation in November 1990.



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Advantages

- GTSPP offers the combination of all profile data into a single format.
- Participants can receive the most complete and timely data set available to produce the most reliable and accurate operational products.
- Participants benefit from global standardization of data formats and processing methodologies to simplify data exchange nationally and internationally.
- Contributions come from more participants so that a heavy workload is not imposed on a small number of active participants .

4

Partners

- Major partners include Australia, Canada, France and USA.
  - Australia: Delay-Mode Data Assembly and QC
  - Canada: Real-Time/Delay-Mode data assembly, QC and Duplicate management
  - France: Delayed-Mode Data Assembly and QC
  - USA/AOML: NOAA SEAS Real-time (delayed mode in preparation)
  - USA/NODC: Continuously managed database (CMD)
    - Delayed mode data QC
    - Data Matching (Real-time / Delayed / Best Copy)
    - Data available as monthly files
    - Web Database Access
    - Offline Data Delivery
- Contributing countries include those making at sea profile observations.

5

Collaborations with other programs

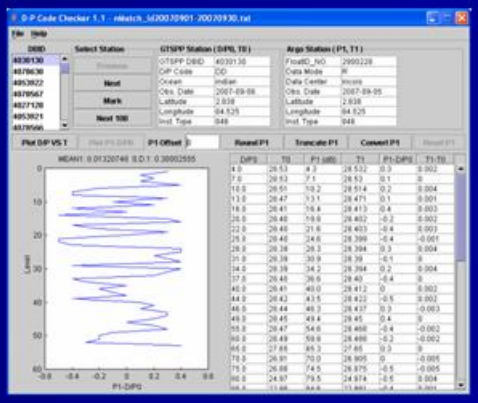
- World Ocean Circulation Experiment (WOCE)
- Climate Variability and Predictability (CLIVAR)
- JCOMM Ship-of-Opportunity Program (SOOP)
- World Ocean Database (WOD)
- NOAA Pacific Region Integrated Data Enterprise Project (PRIDE)
- Argo Profiling Float Project (Argo)
- CLIVAR Carbon Hydrographic Data Office

6

Monitor Argo Floats Reporting on GTS

Four scenarios of matching profiles obtained from the Argo GDAC and GTSPP data streams:

- eMatch: Exact Match
- nMatch (Near) : ROUND(Argo) = GTSPP
- pMatch (Possible): ROUND(DEPTH_CONV(Argo)) != GTSPP
- noCorrection: ROUND(DEPTH_CONV(Argo)) = GTSPP
- uMatch: Unknown



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CCHDO - GTSPP Cooperation

- Convened a CCHDO-GTSPP cooperation meeting on 11 September 2007 in Silver Spring, Maryland, USA.
- NODC developed a "Web Crawler" application in PERL for harvesting data files that are publicly available from the CCHDO Web site.
- Ingested the retrieved files (approximately 22,773 CTD stations) and report problem files back to the CCHDO Data Manager.
- Plan to make this data and their updates available via the GTSPP data system on a quarterly basis, starting 31 January 2008.
- CCHDO will push full updates, including non-public data directly to CORIOLIS.
- The non-public data will be available to the NODC for distribution with a few months (up-to-years) delay.

8

New Developments – I

- Canada is testing a unique identifier with the US SEAS program and now also with one institute in Canada providing delayed mode data.
- Canada has a vocabulary of variable names used by participants and expanded to include other institutes in Canada and BODC.
- Canada has developed capability to both read and write some data in BUFR and this is expanding.

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New Developments – II

- NODC has improved the capability of populating the GTSPP data via the Internet.
- NODC has developed a strategy to fix the confusion of some Argo profiling floats reporting pressure as depth on GTS.
- NODC is collaborating with the Naval Postgraduate School to adapt the Optimal Spectral Decomposition method for producing seasonal temperature and salinity fields in the Pacific Ocean.

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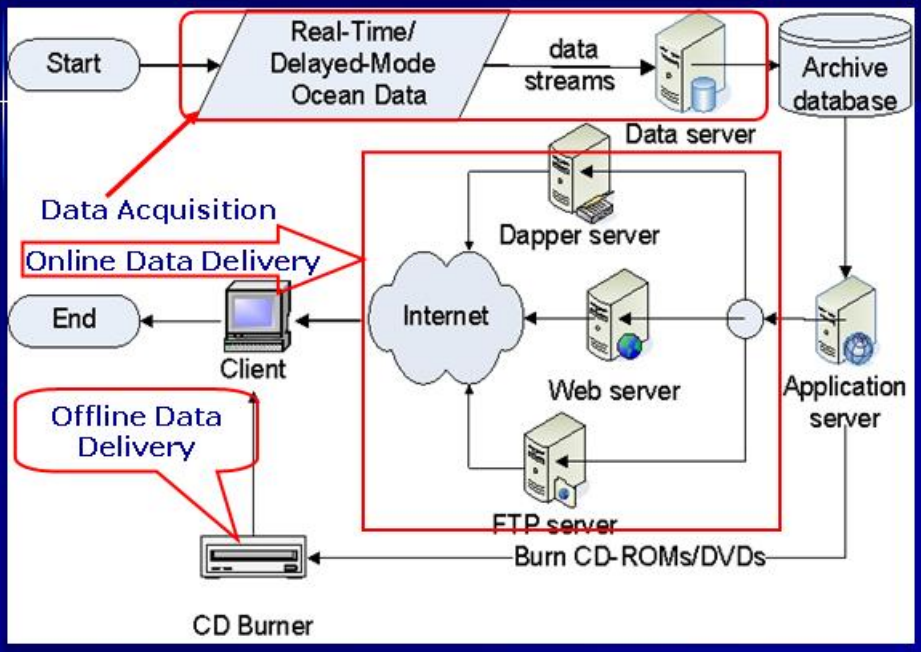
GTSPP Conceptual Design Diagram



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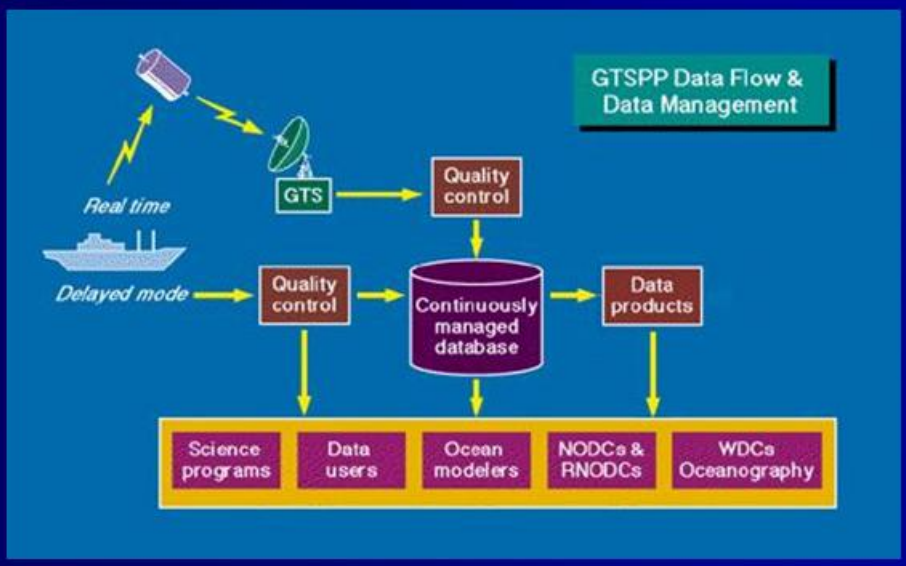
New GTSPP Data Flows Diagram



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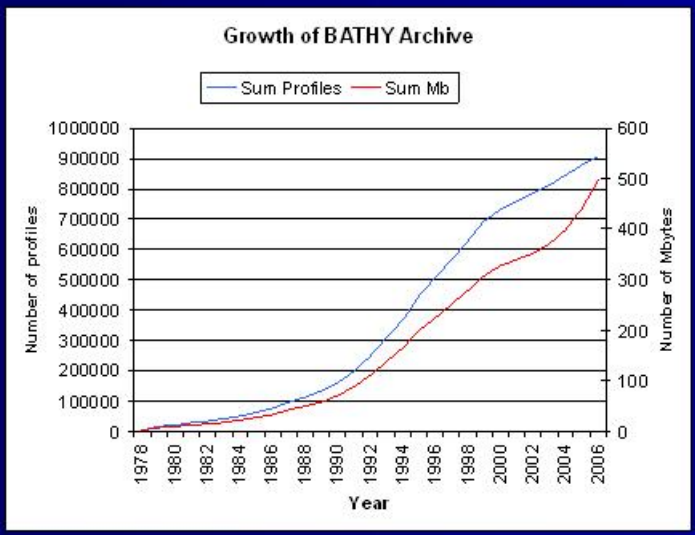
Statistic of BATHY Archive (to end of 2006)



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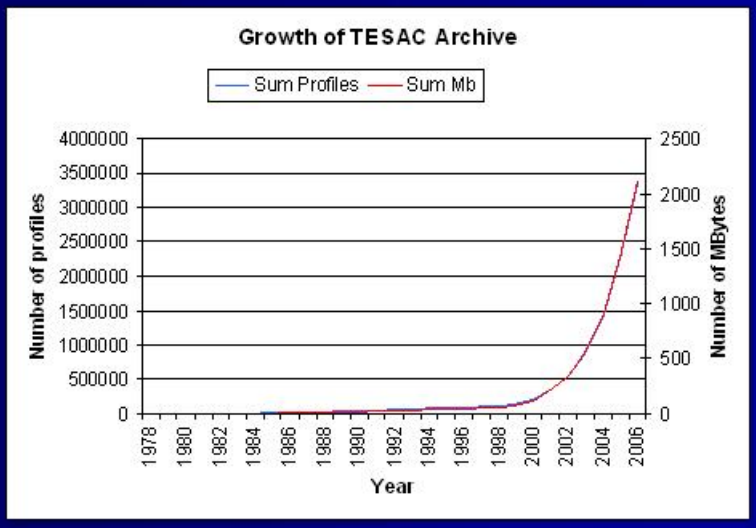
Statistic of TESAC Archive (to end of 2006)



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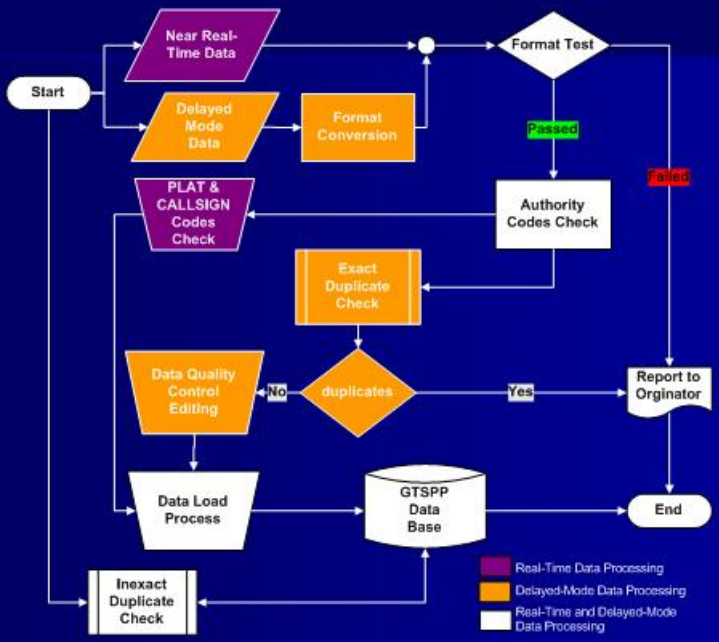
Data Processing Procedure



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Data Quality Cruise Editor: QCED

Features:

- Map of ship position for visual inspection of the cruise.
- Bar graph of the ship speeds between stations in the cruise.
- Waterfall plot of neighboring profiles.
- Profile plot overlaid on the World Ocean Atlas 2001 climatology and ETOPO5 Bathymetry plots
- Temperature/Salinity plot when both are available.
- Formatted text display of all fields from the data file.
- Key metadata displayed in a scrolling list.
- Performs a suite of automated data quality tests and displays "trouble lights" to draw operator attention to questionable data.
- Operator may edit
  - Time and Position.
  - QC flags for temperature or salinity values.

Current Users: US NODC, Argentina INIDEP, US IPRC/APDRC

Future Users: Brazil NODC and Indonesia Marine Affairs and Fisheries (DKP)

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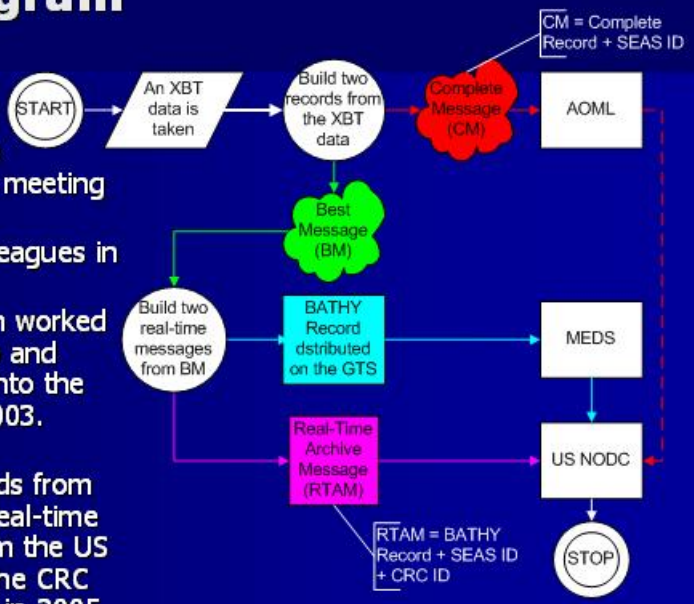
Cyclical Redundancy Check (CRC) Scheme Diagram

- The CRC strategy was discussed at a GTSPP meeting in Hobart, 2002.
- Suggested by our colleagues in Australia.
- The US SEAS program worked with MEDS to develop and incorporate the CRC into the US SEAS system in 2003.
- NODC has received BATHY+CRC ID records from MEDS and the SEAS real-time archive messages from the US SEAS program since the CRC became "operational" in 2005.



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CRC Results from 2005 to 2007

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Online Data Delivery: HTTP Server

http://data.nodc.noaa.gov/gtspp/

- Access Data
  - Real-Time data
  - Best Copy Data
  - User-Defined Data
- Documents
  - Data Quality Control
  - Data Processing
  - Code Tables
  - Meeting Reports

http://www.nodc.noaa.gov/GTSPP

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Online Data Delivery: GTSPP Web Interface (GWI)

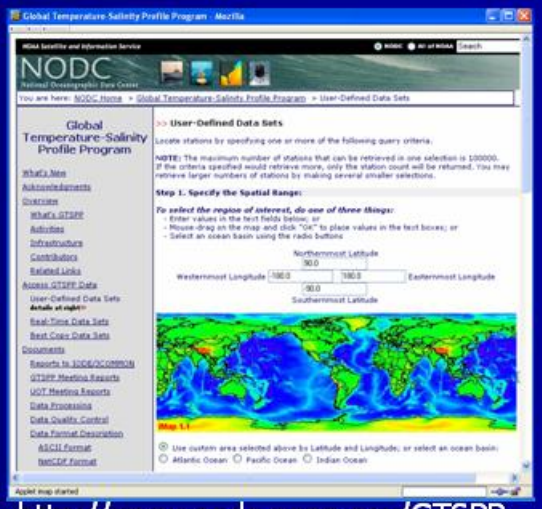
http://www.nodc.noaa.gov/cgi-bin/gtspp/gtsppform01.cgi

Ability to search by:

- Spatial Range (including 3 options)
  - Latitude-longitude text boxes
  - Rubber-band dragging on the map
  - An ocean basin using the radio button
- Date Range (1990 – Present)
- Season Filter
- Data Mode
  (Real Time, Delayed-Mode, or Best Copy)
- Data Type
  (Argo Profiling Floats, TAO/TRITON/PIRATA Fixed Buoys, BOT, CTD, MBT, XBT)

Products:

- List of Station numbers
- Retrieve data and/or display in HTML



http://www.nodc.noaa.gov/GTSPP

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Online Data Delivery: FTP Server

ftp://ftp.nodc.noaa.gov/pub/data.nodc/gtspp/

Data Sorted by

- Ocean-Months
  - "best"
  - "best_inv"
  - "best_nc"

  Monthly Archives
- Ocean Areas
  - Atlantic
  - Indian
  - Pacific

  Station Files

Tools

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FTP Server Structure Advantage

Allows users to use a simple Unix/Linux "wget" command for transferring the GTSPP data over the Internet. Examples:

1. Complete GTSPP Data

   wget -qrN -nH --cut-dirs=2
   ftp://ftp.nodc.noaa.gov/pub/data.nodc/gtspp/
   -P OUTPUT_DIRECTORY_NAME or

2. User-defined Data Sets

   wget -qrN -nH --cut-dirs=2
   ftp://ftp.nodc.noaa.gov/pub/data.nodc/gtspp/USER_DEFINED_DS
   -P OUTPUT_DIRECTORY_NAME

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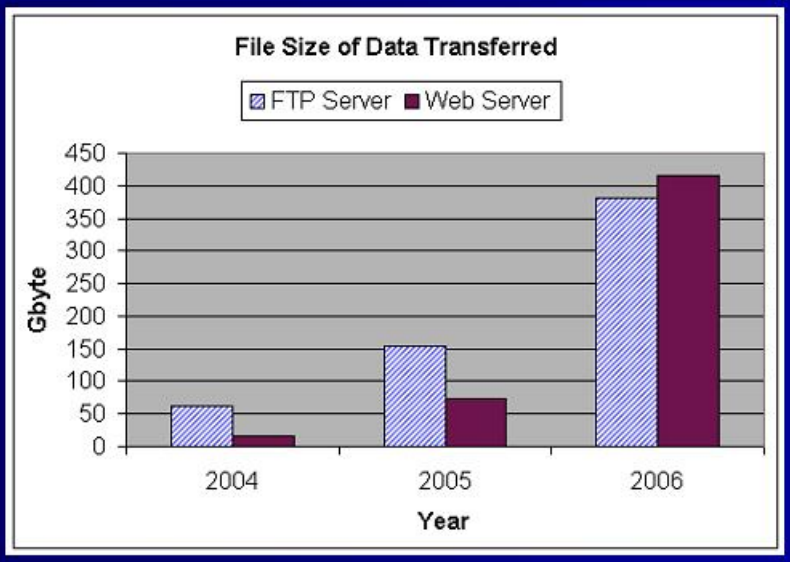
Usage



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DChart Web Application

http://dapper.pmel.noaa.gov/dchart/

A Web viewer designed to visualize and download in-situ data from a Dapper OPeNDAP server (Sirott, 2006.)

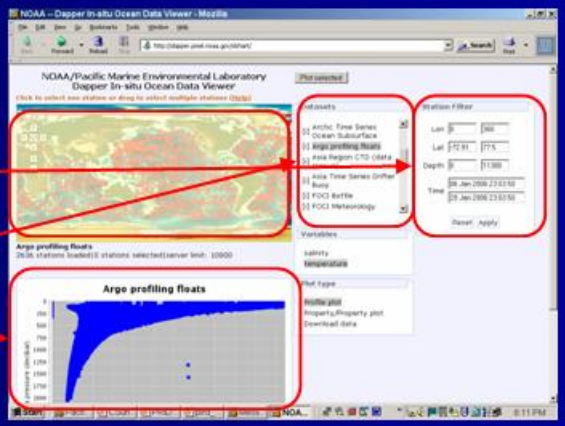
Features include:

An interactive map

A station filter

A data set selector

A plot window



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Offline Data Delivery

DVD Features

- Data stored in the netCDF format, sorted by years and months, then compressed.
- Data size of about 14 GB written to three single layer DVD5±R discs or two double layer DVD9±R discs.
- All documents including meeting reports.
- Tools for exploring the data.
- Written to the ISO9660 format with the RockRidge extension.

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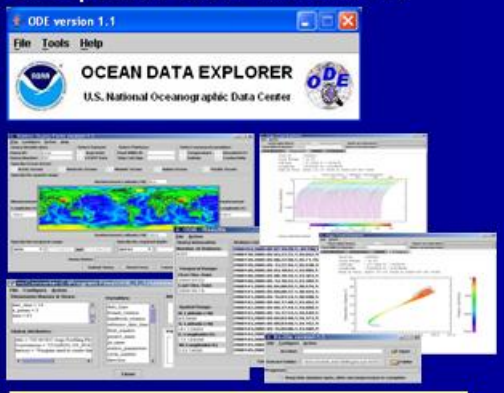
Ocean Data Explorer (ODE)

The ODE application is a software package that provides graphic exploration tools to examine oceanographic data stored on optical disc media. It contains:

- Argo Float Explorer
- SQForm: Station Query Form
- ncConverter: Convert NetCDF files
- EzGTar: Uncompress files



Snap Shoots of the ODE features

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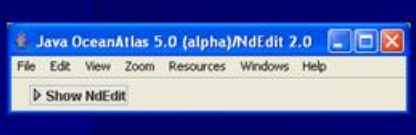
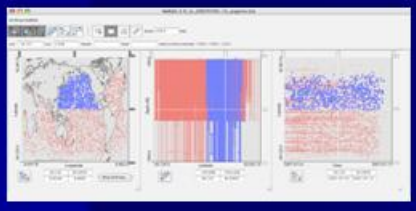
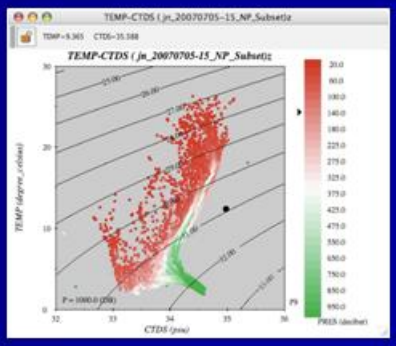
Java OceanAtlas

Java OceanAtlas (JOA) is a Java-based application that allows users to import the Argo/GTSPP inventory files, download and create a Internet-based "on-the-fly" database.







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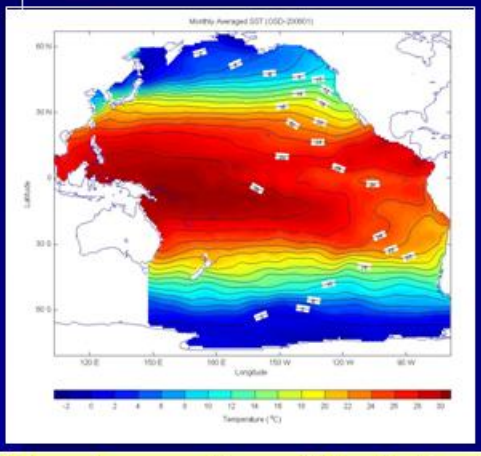
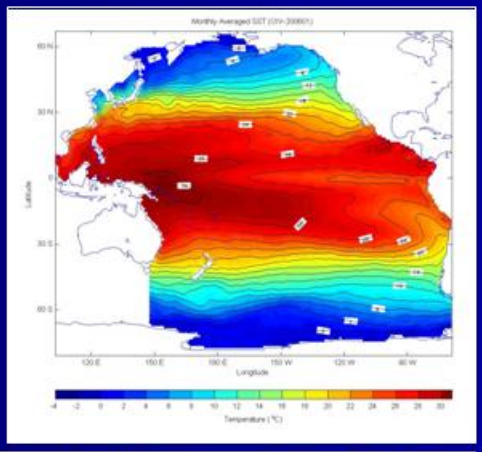
Preliminary GTSPP Products





Visual comparison of the Optimal Spectral Decomposition (OSD)-derived SST (left) to the NOAA Optimally interpolated SST (right)

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Concerns

- Some Argo floats are reporting pressure as depth on GTS and we seek their help to correct this.
- Is anyone else installing CRC?
- Should we invite an outside review of GTSPP?
- With the ending of WOCE funding, the science centre QC formerly done by 3 centres has ceased. Are we looking for other partners or re-inventing the "wheel" such as using the outputs of the OI (or OI-like) of in-situ data prepared for model ingest?

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Future Plans

- Continue operations.
- Continue collaborations.
- Provide metrics to JCOMM.
- Continue to evaluate CRC data tag.
- Add WOA 2005 and new bathymetry to "QCed".
- Improve annual reports to IODE and JCOMM.
- Cooperate with NPS to complete the development of the optimal spectral decomposition (OSD) method in 2009.
- Develop logic for visual exploration of the GTSPP data in the Google Earth™ software.

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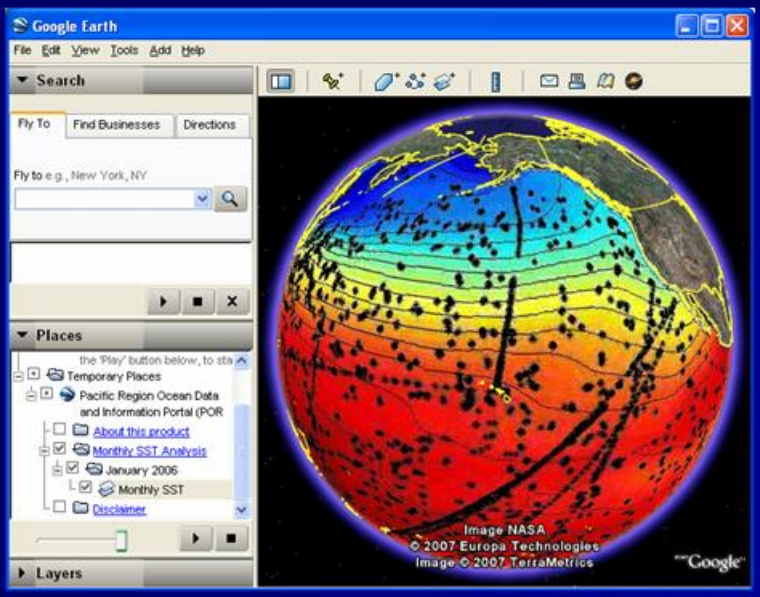
GTSPP Data in Google Earth™



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Acknowledgments

- Argo Data Management Team
- Ship Opportunity Program of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
- Dr. Peter Chu for developing the optimal spectral decomposition method
- Mr. Joe Siroitt for developing the Dapper/DChart Server
- Mr. John Osborne for integrating NQuery with Java OceanAtlas
- Dr. Norm Hall for managing the GTSPP database and
- Ms. Melanie Hamilton for processing the GTSPP data

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Annex 5: Notes for Argo Meeting: World Ocean Database Perspective by Tim Boyer

Conclusion

- **Argo data system is the gold standard, but there is still a need for better communication of information to users**

Notes for Argo Meeting: World Ocean Database Perspective

Tim Boyer

Main Contribution:

The World Ocean Database will be updated Quarterly

Why?

- **We are funded to update ocean heat content every 3-months. Data must be available for reproducibility**
- **Data originators want to see their data available in a more timely manner**
- **Argo salinity adjustments need most current data**

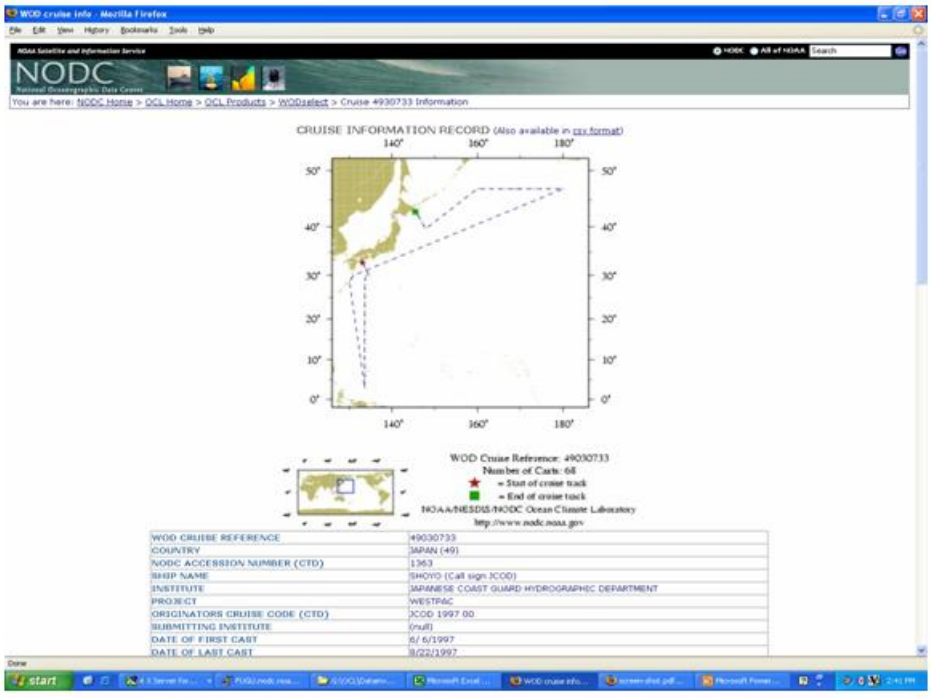
How/When?

- **Entire public online database will be updated from internal database.**
- **Every 3 months, starting at the end of February, 2008.**
- **Notification will be sent out via RSS feed.**

Where?

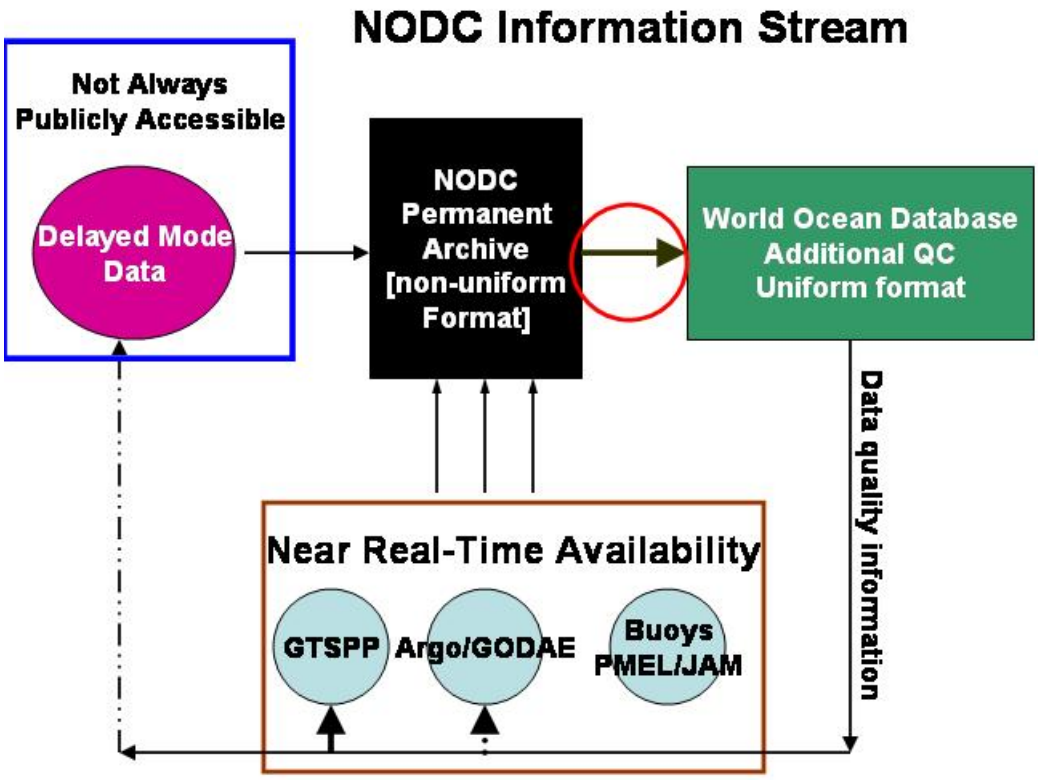
- **WODselect data selection tool**
  http://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html
- **Geographically and year sorted WOD data**
  http://www.nodc.noaa.gov/OC5/WOD05/pr_wod05.html
- **Update files**
  http://www.nodc.noaa.gov/OC5/WOD05/updates05.html

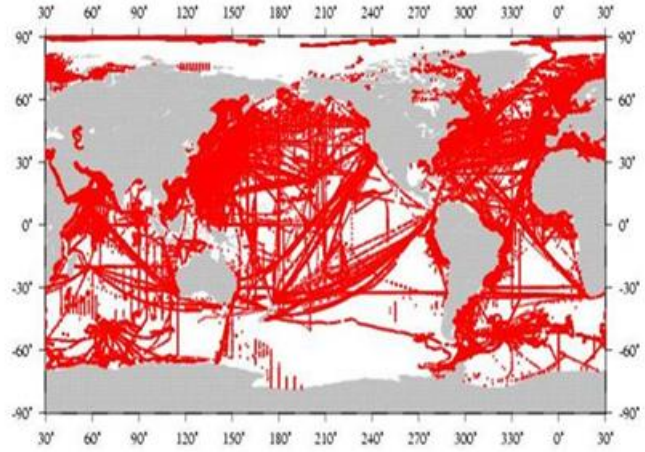
World Ocean Database Update Page



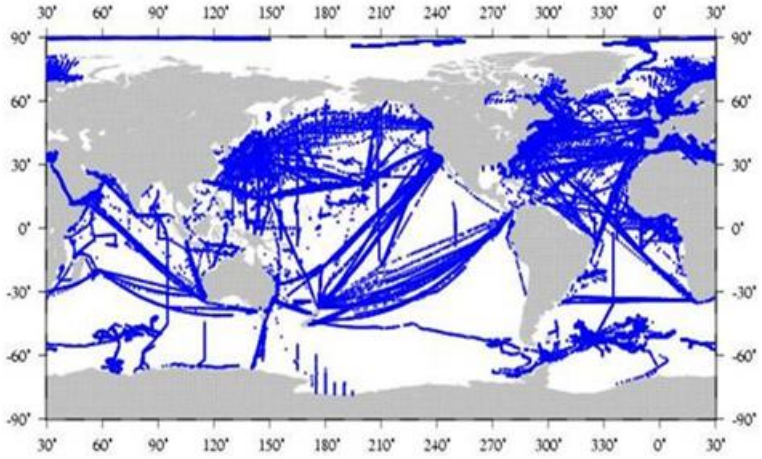
WODselect cruise information page

Most Important: What?

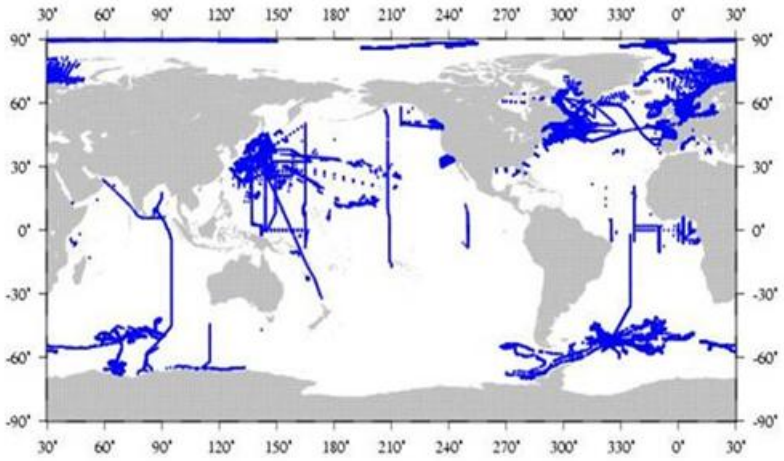




Data Added Since WOD05 release
(not including Argo or moored buoy)
281,573 casts



Data additions for years 2005-2007
(not including Argo or moored buoys)
97.054 casts



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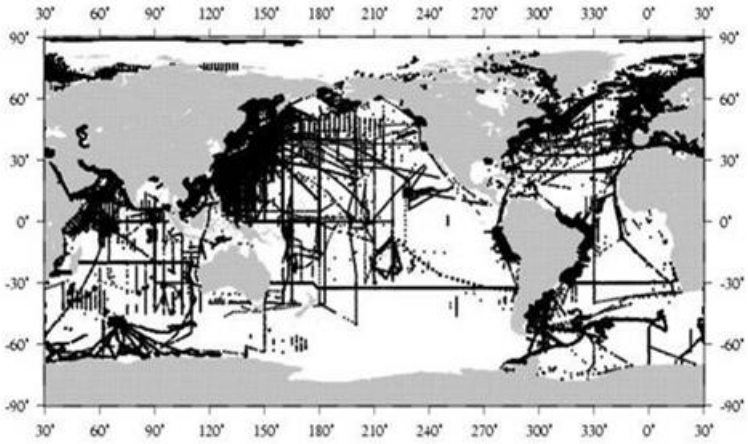
Salinity Data added for years 2005-2007
(not including Argo and moored buoys)
48,478 casts



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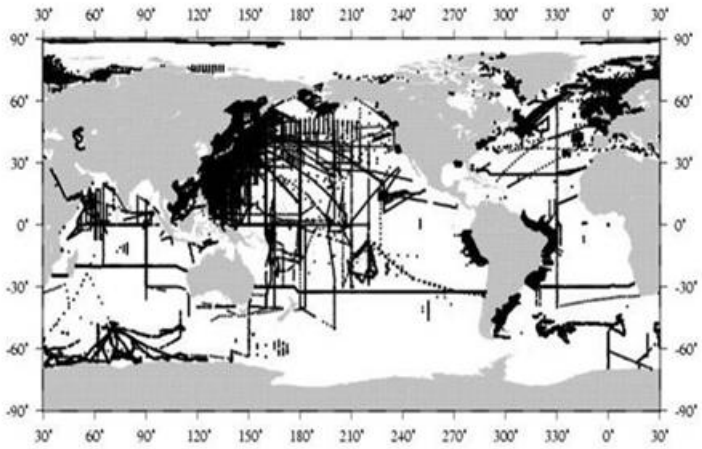
Data added for years pre-2005
(not including Argo and moored buoys)
186,519 casts



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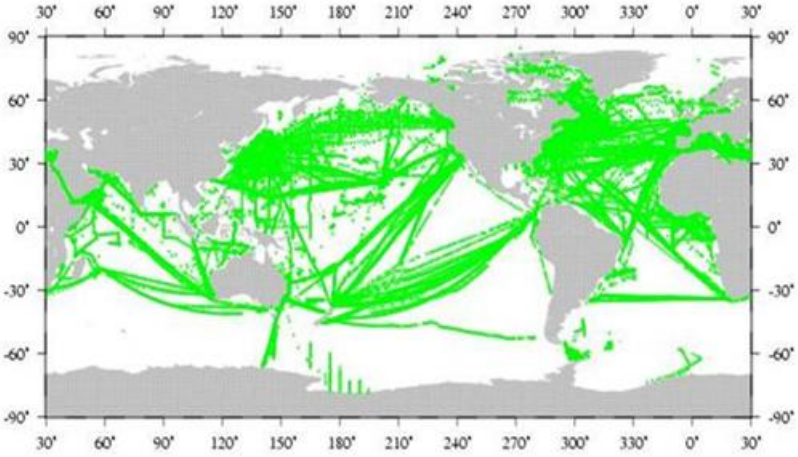
Salinity data added for years pre-2005
(not including Argo or moored buoys)
140,047 casts



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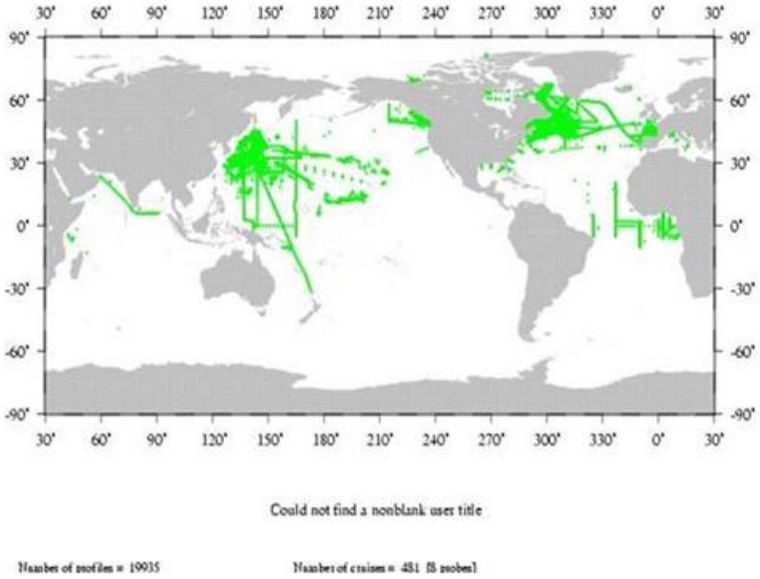
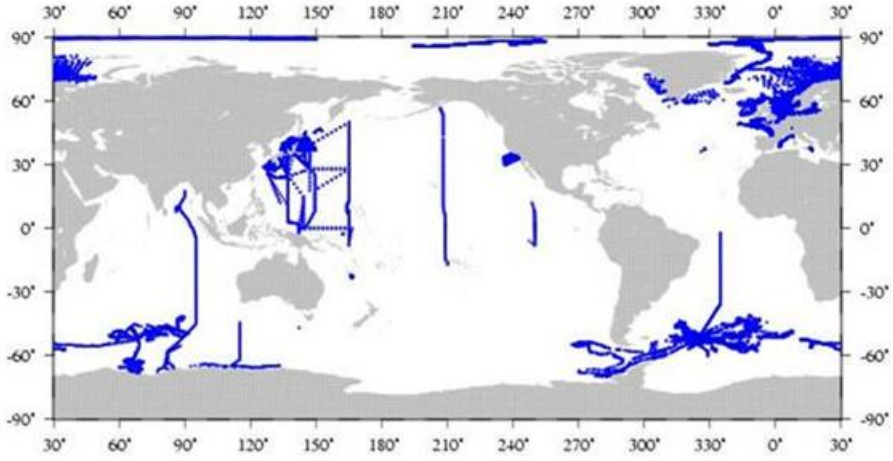
GTSPP data added for years 2005-2007
(not including Argo or moored buoys)
79,290 casts



GTSPP salinity data added for years 2005-2007
(not including Argo or moored buoys)
19,935 casts



Non-GTSPP salinity data added for years 2005-2007
(not including Argo or moored buoys)
31,050 casts

Conclusion

- **More timely release of World Ocean Database updates can help to meet the needs of the Argo community for timely access to salinity (and other) data**

Suggestions for Argo

- **More detailed information in automatic data format**
- **Quicker communication of problems**
- **Better mechanism for user feedback**

More Automatic Details

- **A user should be able to have all information necessary to go from real-time to delayed mode profiles.**
- **Some information is available as irregular text**
- **Too many floats to examine each one for large-scale study (heat content).**

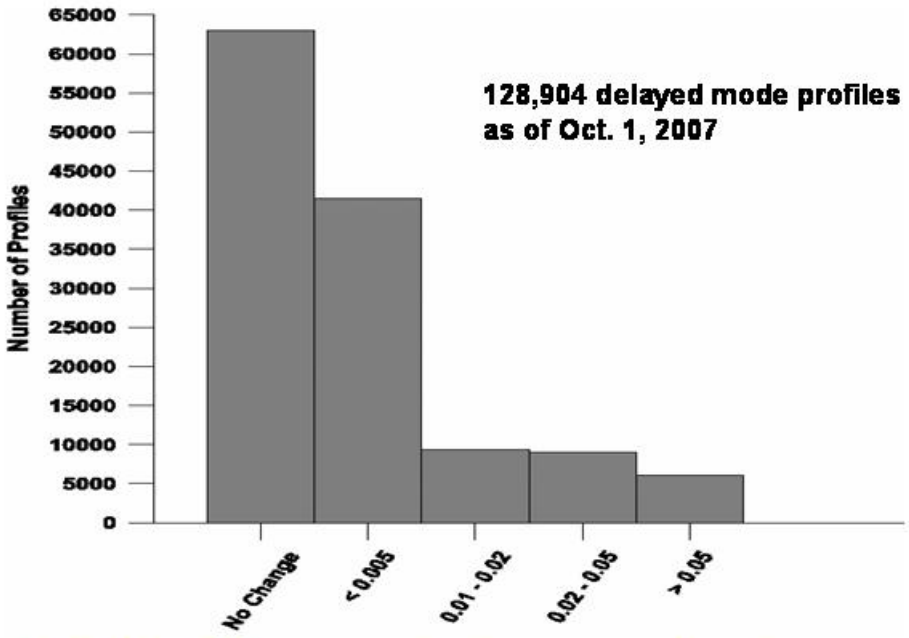
Thermal Response Correction

- Well detailed in paper by Johnson et al. (2007)
- **Where is the information to apply to data?**
- **Should be in data files.**

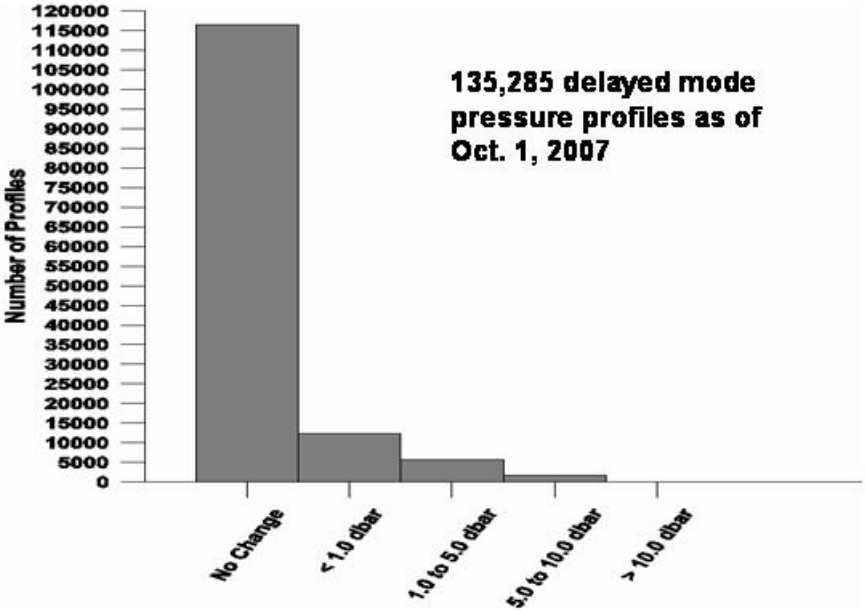
Salinity Drift Adjustment

- Need a netcdf variable "Sal_Adjust that gives the salinity adjustment made to the delayed-mode profile

- **User can make decisions based on the size of adjustment (use or don't use)**



Salinity difference between real and delayed mode averaged over each cast



Pressure differences between delayed and real mode averaged over each profile

Quicker Information

- Pressure recording problem for Seabird CTD packages on SOLO floats was not made common knowledge in a timely manner

Annex 6: GTSPP Data Management in NMDIS by Fengying Ji

Thank you

GTSPP DATA MANAGEMENT IN NMDIS

National Marine Data &Information Service, China
Nov.12, 2007, Hobart

Outline

- About us
- T-S profiles QC software
- Eliminate duplicate profile data software
- Data service website

About us

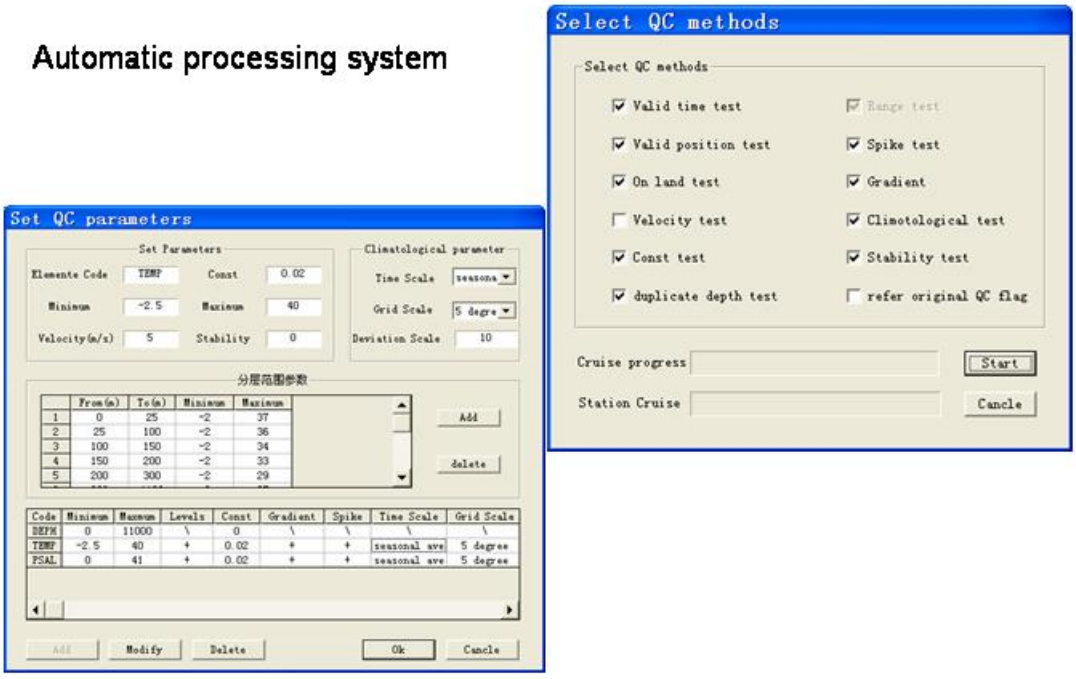
- With the help of NODC （USA）and MEDS (Canada)，we began to process GTSPP data in 2005.
- Until now, we have built a procedure to process, management, archive and service GTSPP data.
- To ensure the quality of GTSPP data, we finished two visual interact soft wares, which are T-S profile QC software and flaging duplicate data software
- A web site has also been set up to serve GTSPP data

T-S profile QC software 1

- Based on the 'Manuals and Guide #22 GTSPP Real-time Quality Control Manual'
- Developed by Visual C++6.0 and map package of Matlab 6.5 on Windows platform.
- Process Temperature and Salinity data automatically
- Based on the visual, interact system, the operators can flag the data flexibly.

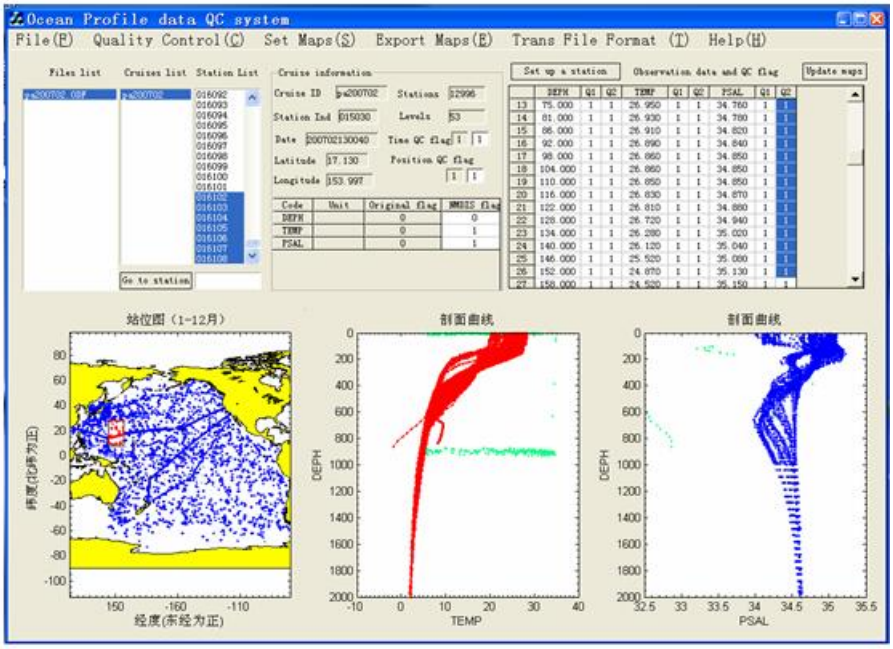
T-S profile QC software 2

Automatic processing system



T-S profile QC software 3

Multi-profiles are checked visually at the same time



T-S profile QC software 4

The QC result is appended to the history information of GTSPP data files in meds format, in which

ident_code='CN'
prc_code='QCCN'
version = '1.0 '
prc_date='200706'
act_code(i)=''
act_param(i)=''
aux_id(i) =''
previous_val(i)=''

We hope NMDIS information is appended to GTSPP code tables

Question

- Different QC methods will lead to different QC result, it will take operators and scientists much time to assess all of this information to decide what quality flags are appropriate.

Suggestion

- in order to improve the effect of automatic QC procedure, we should sorting QC methods and put a weight on each QC method to get a reasonable result

Eliminate duplicate data software 1

EXACT DUPLICATES

- Cruise information(country, cruise ID…)
- Date and time (year, month, day, hour, minute)
- latitude and longitude (degrees, minutes, seconds, hemisphere)
- Profile data(pressure, temperature, salinity, PH,…)

are all same

INEXACT DUPLICATES

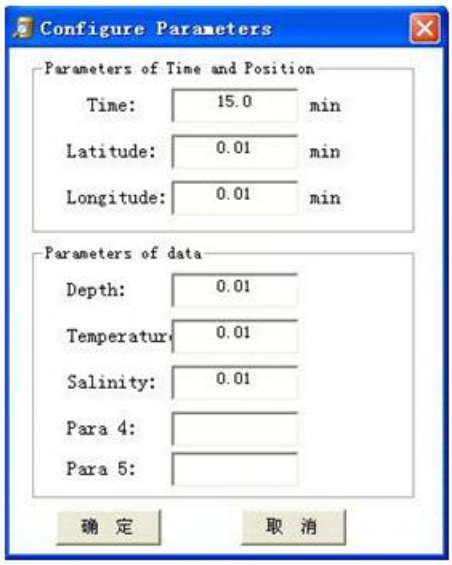
- Date and time (year, month, day, hour, minute)
- latitude and longitude (degrees, minutes, seconds, hemisphere)
- Profile data(pressure, temperature, salinity, PH,…)

are slightly different

Eliminate duplicate data software 2

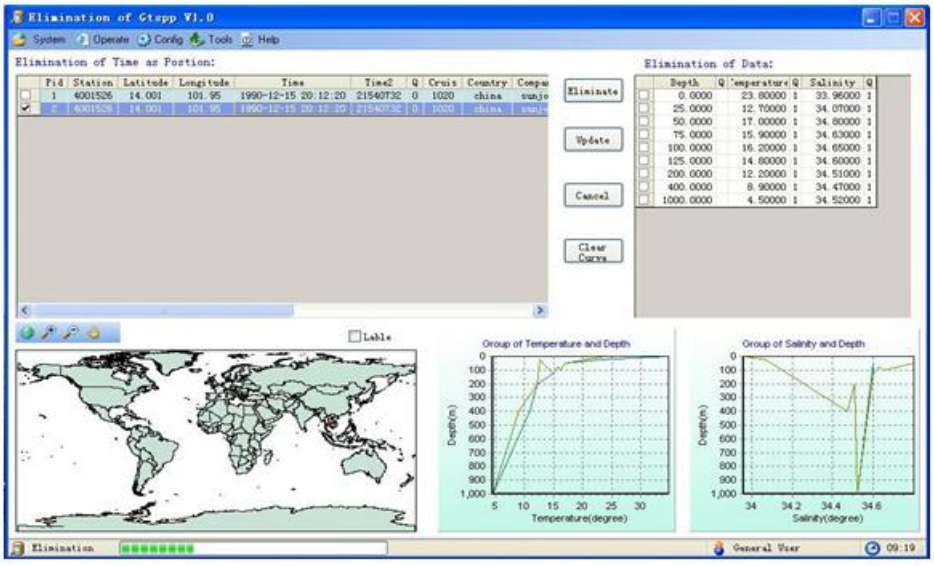
part1 :
Automatic processing

1. Import data files
2. Set parameters for exact duplicates
3. Add duplicate QC flags on exact duplicate profile data
4. Get the list of inexact profiles for visual inspect



Eliminate duplicate data software 3

- Click the index of inexact duplicate profiles, visually check P-T and P-S figures one by one.
- Put the duplicate flags according to the cruise information, observation time and profile data



Eliminate duplicate data software 4

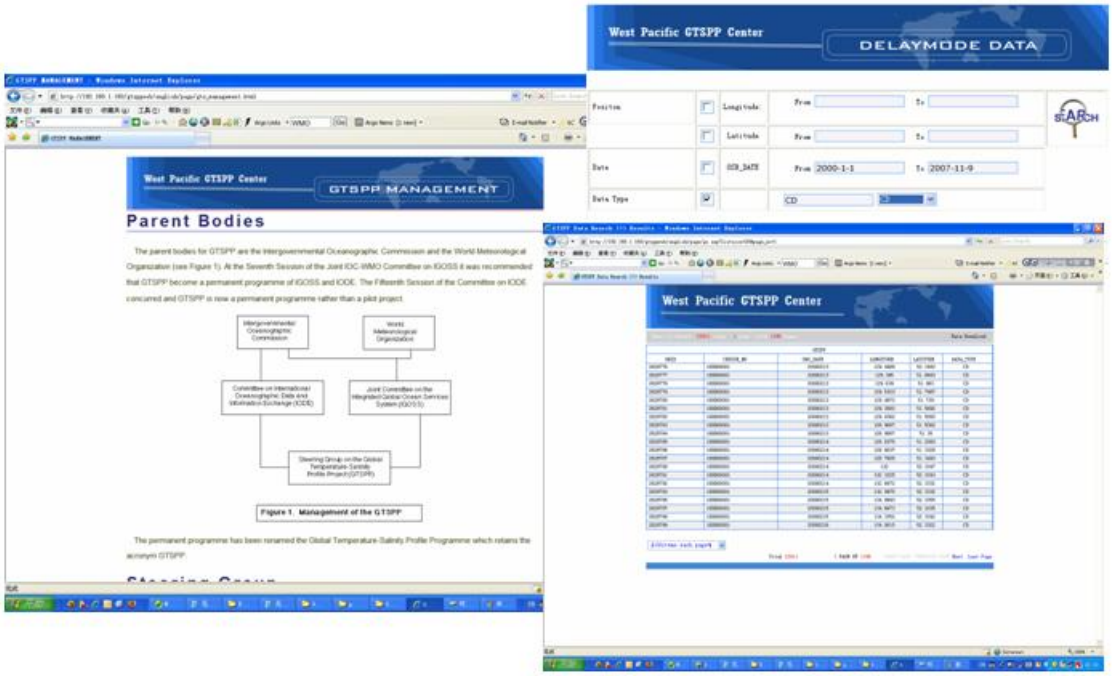
Achievement

More ever this software can flag duplicate data from different files.

Difficulty

- How to set appropriate parameters to judge the inexact duplicate data

We are proud of

- Our softwares can not only process real time data automatically, but also provide convenient tools for visual check.

GTSPP data service web site