



Presented at SOT-V, Geneva
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Monthly report on GTS data quality, code usage and SOOP line occupation

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ISDM and GTS data

- ISDM decodes, processes and quality controls GTS profile data (BATHY, TESAC) on a tri-weekly basis
- QC methods follow GTSPQ QC manual : combination of automatic and visual tests
- The QC flags are sent together with the data to various data centers
- The data are archived at ISDM along with QC flags

This monthly report only uses GTS data
only BATHY & TESAC

Report characteristics

- Coverage : **Monthly**
- Production frequency : **~Monthly** (...nudge)
- Form : **5 text files + 1 map (PNG)**
- What does it report on :
 - 1. GTS DATA QUALITY**
 - 2. GTS CODE USAGE**
 - 3. GTS SOOP LINE OCCUPATION**
- Where is it available:

<ftp://ftp.meds-sdmm.dfo-mpo.gc.ca/pub/ShipReport>

(2007-)

1.Data quality

Objectives:

- A) Identify root problems which are responsible for systematic problems in a platform's month profiles : MMM YY.DOC
- B) Report over all data quality statistics: WOCE.BOB

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- A) Identification of platforms whose reported profiles contain at least ~10% profiles with at least one data point flagged as wrong or doubtful
 - A platform reporting ten profiles with a spike in salinity in a given profile will be singled out
 - A platform which measured 150 XBTs and 14 of which had serious problems will not be singled out for inclusion in this part of the report

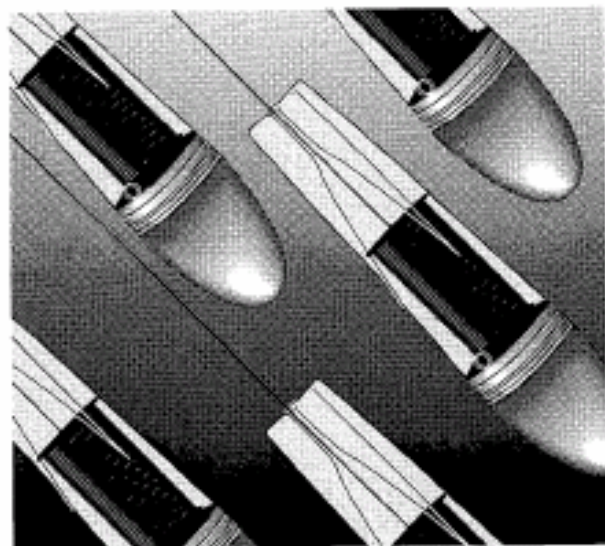
Quality Control Cookbook for XBT Data

CSIRO
MARINE LABORATORIES
(*Expendable Bathythermograph Data)
13 SEP 1994

Version 1.1

LIBRARY, HOBART
TASMANIA

R. Bailey, A. Gronell, H. Phillips, E. Tanner
and G. Meyers



1994



GTSP REAL-TIME QUALITY CONTROL MANUAL

1.Data quality (cont'd)

Objectives:

A) Identify root problems which are responsible for systematic problems in a platform's month profiles : MMM YY.DOC

→ B) Report over all data quality statistics: WOCE.BOB

B) Statistics for all reporting platforms, with their

- Lat / lon sampling limits
- total and average # messages reported
- # of stations which failed a data quality, position or time test (either visual or automatic) or had their QC flag changed

Decisions on quality flags are sometimes overruled at report creation time, causing slight discrepancies between (A) and (B)

1.Data quality (cont'd)

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MXHR6 (1 of 4) CTD

TE: One profile consisted of anomalous low temperature and salinity values at 102 m depth.

PJJU (10 of 20) Sippican Deep Blue, Sippican MK-21

BA: Seven profile show spikes towards higher temperature values. Two profiles are almost completely isothermal over ~900 m depth. One profile shows suspiciously increasing temperature with depth below an inflexion point at 578 m depth.

UBSZ (5 of 12) Sippican Deep Blue, Sippican MK-21

BA: Five profiles seem to show insulation penetration problems: temperature increases from a

DATA QUALITY STATISTICS / STATISTIQUES SUR LA QUALITE DE DONNEES

CR_NUMBER_	DATE_		LAT_		LONG_		BA	TE	REC	POS	DT	PROF	CLIM	AVE
Q990016609	20090210	20090228	62.26 S	67.43 S	73.16 W	60.58 W	0	56	21	0	0	21	0	2.9
Q990016709	20090212	20090228	62.31 S	68.38 S	70.39 W	61.10 W	0	44	21	0	0	21	0	2.6
Q990016809	20090202	20090228	62.30 S	68.40 S	71.37 W	60.43 W	0	75	33	0	0	33	0	2.8
Q990016909	20090201	20090228	52.20 S	54.21 S	102.40 E	90.37 E	0	47	0	0	0	0	0	1.7
Q990017109	20090201	20090228	64.23 S	68.08 S	75.27 E	78.58 E	0	49	0	0	0	0	0	1.8

1.Data quality (cont'd)

Limits:

- (A) The root problem can't always be assessed. A description of what is wrong with individual profiles is then given
 - (A) Can't always discriminate between an instrument malfunction and a transmission or communication problem, let alone features made more apparent due to decimation or inflexion points selection
 - For a while I was reporting on apparent Argo float problems, some were caused by an internal merge of partial messages. We removed Argo floats from the report in Oct 2007.
 - (A) Results depend of objective QC tests (GTSP) but also subjective operator judgment. Platforms who might have been subjectively under flagged are not likely to be reported.
- Hence the complementarities of (A) and (B)

2.Code usage

We identify every platform who reported while using either

- an old code (JJYY, JJXX, KKXX)
- an actual code (JJVV, KKYY) with missing instrument or recorder information, or incompatible instrument and recorder information

Files created: OUT_TE.BOB (Tesac)

OUT_BA.BOB (Bathy)

Summary: MMM YY.DOC

Limits: WMO table code information must be up to date

- The program had to be modified when marine mammals started reporting with new code (October 2008), and also when Devil-2 Acquisition system appeared in combination with Sippican Deep Blue (July 2008)

MXHR6 (1 of 4) CTD

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PJJU (10 of 20) Sippican Deep Blue, Sippican MK-21

BA: Seven profile show spikes towards higher temperature values. Two profiles are almost completely isothermal over ~900 m depth. One profile shows suspiciously increasing temperature with depth below an inflexion point at 578 m depth.

UBSZ (5 of 12) Sippican Deep Blue, Sippican MK-21

BA: Five profiles seem to show insulation penetration problems; temperature increases from a given depth onward and though recovers partly in some profiles, fail to recover completely. Those profiles also end prematurely compared to others taken in same region and timeframe by platform.

ZCDJ3 (53 of 146) Sippican Deep Blue, Sippican MK-21 / Sippican Fast Deep, Sippican MK-21

BA: Thirty-eight profiles show a sudden increase in temperature starting at ~900 m depth and persisting until the bottom. Thirteen profiles seem to show insulation penetration problems, the majority of which start to manifest at ~400 m depth. One profile shows a sudden deflection towards low temperature values at ~470 m depth followed by continuous decrease until the premature end of the profile at 526 m depth. One profile shows several spikes and bulges towards higher temperature values superimposed to an overall higher than normal decrease rate of temperature with depth.

MEDS Report date (YYYYMMDD): 20090429

Start and end observation dates (YYYYMMDD): 20090201 20090228

Total number of stations: 2628

Total JJXX = 0

Total JJYY-1 = 0

Total JJYY-2 = 80

Total JJVV-1 = 351

Total JJVV-2 = 2197

Column headings:

- JJXX: The number of stations in JJXX format
- JJYY-1: The number of stations with ///99
- JJYY-2: The number of stations in full JJYY format
- JJVV-1: The number of stations with ///99
- JJVV-2: The number of stations in full JJVV format

3. Code usage

In February, at least one platform (SHIP) used the old JJYY code form and at least six platforms (5BDC2, 5WDC, DFCX2, FHZI, HSB3402, SHIP, VNVN) used the JJVV form, but missing instrument or recorder information.

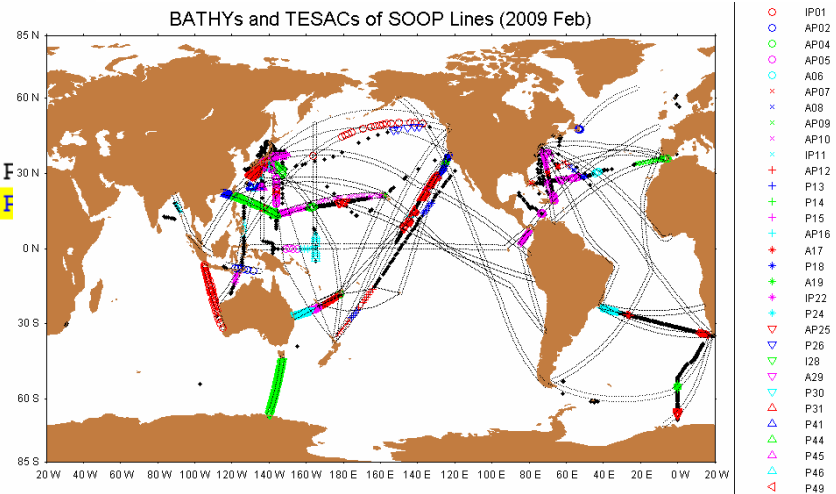
Call Sign	JJXX	JJYY-1	JJYY-2	JJVV-1	JJVV-2
10004	0	0	0	0	109
10007	0	0	0	0	110
10044	0	0	0	0	112
5BDC2	0	0	0	62	0
5WDC	0	0	0	105	0

3.SOOP Line occupation

Using a simple "in / out" algorithm and a definition of SOOP lines as polygons, we create :

- a list of platforms and which SOOP lines they occupied if any ([SUMMARY FILE.TXT](#))
- A colour/symbol coded map showing all profiles taken by platforms who took at least one profile in a SOOP line polygon ([STNLINES.GIF](#))

Start date:	200902			
Cruise #		Total # of Stations	Stations on SOOP Line(s)	SOOP Line(s)
5BDC2	09,	62 ,	61 ,	IX01
5WDC	09,	105 ,	93 ,	PX04 , PX12 , PX05 , F
7JWN	09,	74 ,	49 ,	PX04 , PX05 , PX01 , F
A8CE9	09,	17 ,	9 ,	AX08 , AX07
AITU	09,	5 ,	0 ,	NONE
ATIU	09,	4 ,	4 ,	IX11
CFD4703	09,	1 ,	0 ,	NONE
CG2676	09,	11 ,	11 ,	AX02
CWQ03	09,	2480 ,	0 ,	NONE
DEQD1	09,	8 ,	0 ,	NONE
DFCX2	09,	49 ,	13 ,	PX11 , IX22
DFTH2	09,	168 ,	57 ,	AX17 , AX12 , AX16
ELZY3	09,	189 ,	115 ,	PX25 , PX31 , PX16 , F

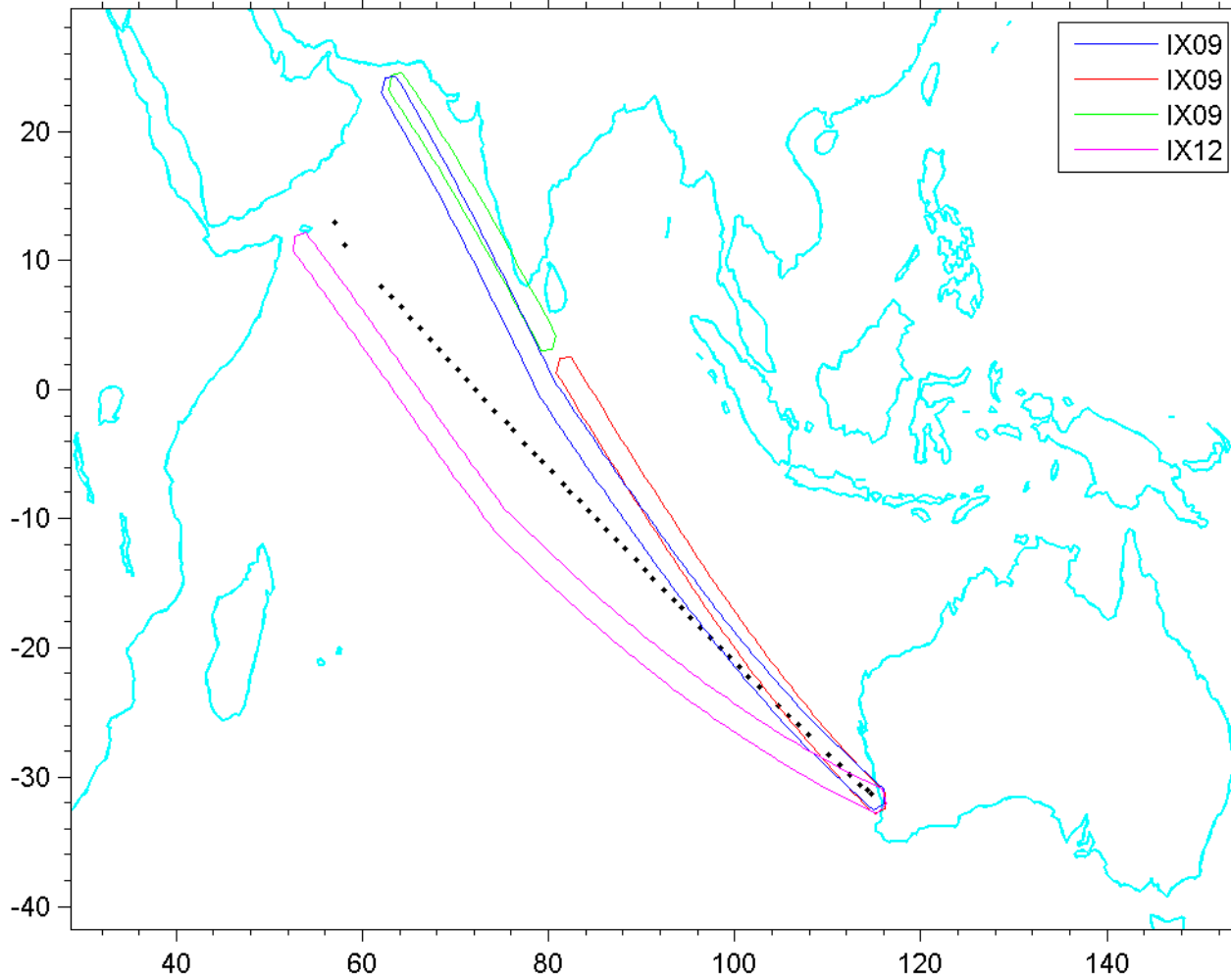


3.SOOP Line occupation (cont'd)

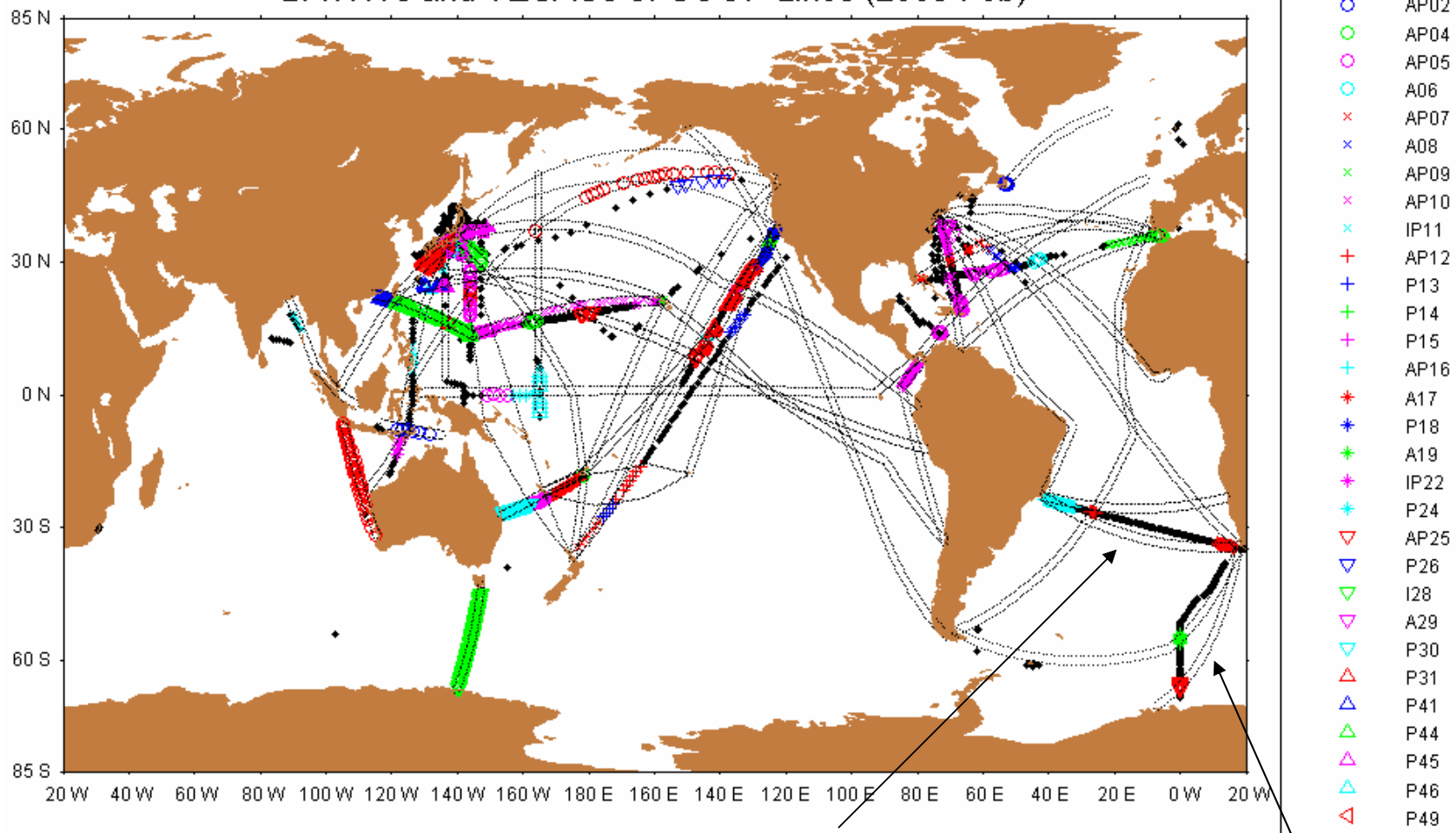
Limits :

- It is hard to decipher symbols on a large scale
- Ships who orthogonally cross a given line will display all their month's profiles on the map, most of which will be "black dots"
- There is an important variability of SOOP line definitions, some of which share same ports (last update : Sep 2000)
 - For a while, we identified *Canberra Express* (DFCW2) as sampling **IX09** while CSIRO thought it was sampling **IX12**

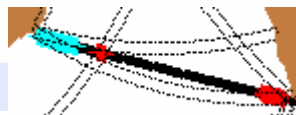
DFCW2 May 2008



BATHYs and TESACs of SOOP Lines (2009 Feb)



30/04/2009 ISDM/GDSI



3.SOOP Line occupation (cont'd)

Solutions :

- Dynamic map
- Advanced algorithm (introduce directional analysis, distance monotonously increasing between profiles, percentage of line distance covered, etc)
- Repository for SOOP line definitions (time dependent?)

History

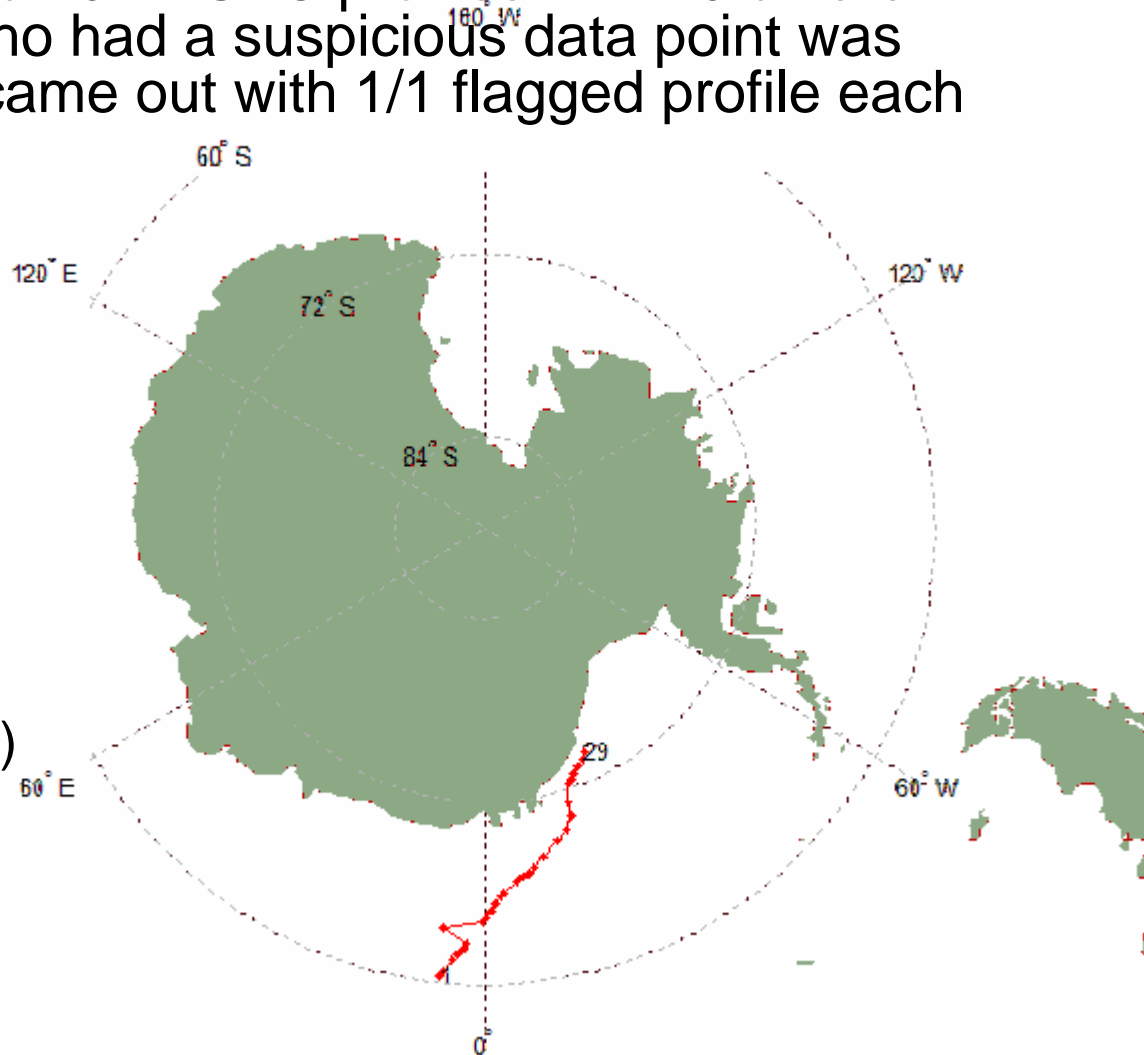
- 1990s : Report was started Bob Keeley (WOCE program)
- 2005/06: Report was handed over to Mathieu Ouellet
- 2007/10 : Argo floats were dropped from report
- 2007/11 : Increase in # of TESAC messages received forced to rewrite software and redesign of report to discard moored chains and buoys who report too often; monthly production is halted for the first time
- 2008/01 : Production resumes slowly
- 2008/07 : Backlog cleared, Devil-2 problem reported by Lisa Cowen and fixed
- 2008/09 : 3 months backlog cleared
- 2008/10 : Update of programs to account for marine mammal codes
- 2009/04 : 6 months backlog cleared, redesign of stnlines,png map and add-on of reported instrument names in quality report

What did it do for us lately

- An Antarctic ship reported 29 TESAC profiles with 29 different call signs; each profile who had a suspicious data point was singled out; 4 platforms came out with 1/1 flagged profile each

71071 ... 71092
74096 ... 74101

(Dec 2008, found in April 2009)



What did it do for us lately

- Found reported instrument mismatch
 - Call sign 42021 is clearly a moored offshore buoy with two oceanographic sensors, but its reported instrument code is CTD

(Jan 2009, found in April 2009)

What did it do for us lately

- Reviews operator's QC decisions and educate ops (Kuroshio, Med outflow, etc) to reduce amounts of over flagging

Filename	Data Quality	Code Usage	SOOP Lines
MMM YY.DOC	Bathy & Tesac from all ships and some moorings	All Bathy & Tesac	
WOCE.BOB	All Bathy & Tesac		
OUT_BA.BOB		All Bathy & Tesac	
OUT_TE.BOB		All Bathy & Tesac	
STNLINES.PNG			Bathy & Tesac from all ships
SUMMARY_FILE.TXT			Bathy & Tesac from all ships and some chains / moorings

<ftp://ftp.meds-sdmm.dfo-mpo.gc.ca/pub/ShipReport>

Contact list to be notified of updates:

CSIRO	Ann Thresher
BOM	Graeme Ball
	Lisa Cowen
NOAA	Gary Soneira
	Derrick Snowden
	Yeun-ho Chong
	Shaun Dolk
NODC	Melanie Hamilton
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