direction de la technologie marine et des systèmes d'information
département informatique et données marines

June 2007 / idm-sismer/ 07-111

COATANOAN Christine

Real Time
Standard test dataset

Annex : results by DAC

Real Time

Standard Test Dataset

This document aims to present the results of Argo real time quality control tests. This work has been done to check and make uniform the Argo quality control of each DAC.

This is the RTQC Procedure test — ADMT7 Action 23.

Summary

1. STANDARD TEST DATASET : DETAILS ON RESULTS BY DAC 6

  1.1. AOML 6
  1.2. BODC...7
  1.3. CLS 20
  1.4. CSIO 23
  1.5. CSIRO...26
  1.6. CORIOLIS 27
  1.7. INCOIS...29
  1.8. JMA 37
  1.9. KMA...38
  1.10. MEDS 38

1. Standard test dataset : details on results by DAC

Reception's date of the results :

DAC	Date	Remarks
CSIO	28/11/2006	
BODC	01/02/2007	
CLS	01/02/2007	
INCOIS	21/02/2007	
CSIRO	02/03/2007	
MEDS	13/03/2007	already sent, lost somewhere in the network
AOML	21/03/2007	
JMA	05/04/2007	
KMA	05/07/2007	Other dataset

Take care that for some DACs, results are presented after association of a few tests when the results of the reference data set is proposed only for the studied test.

1.1. AOML

Results sent by : Yeun-Ho Chong Daneshzadeh e-mail yeun-ho.chong@noaa.gov
Comments sent from Claudia Schmid e-mail `schmid@aoml.noaa.gov`

The overall results are very good. The good profiles were all passed as good profiles.

For the individual test cases, the results were matched with suggested results except the "pressure increasing test", and they are currently implementing the "deepest pressure" and the "gross salinity or temperature sensor drift" tests.

He pasted the PRES and PRES_QC from 'ncdump' of R1900044_121.nc below:

```
PRES =
    8.1,    9.6,   19.5,   29.5,   39.4,   49.1,   59.1,  69.2,
   79.1,   89.5,   99.2,  109.4,  119.0,  129.4,  139.1,  149.4,
  159.0,  169.2,  179.1,  188.8,  199.3,  209.5,  219.4,  229.4,
  239.4,  249.3,  259.5,  269.3,  279.2,  289.4,  299.1,  309.1,
  319.5,  329.5,  339.1,  349.5,  358.9,  379.3,  399.2,  448.9,
  499.3,  549.3,  599.1,  649.3,  699.4,  855.5,  899.5,  949.5,
  999.2, 1049.0, 1099.6, 1149.2, 1199.4, 1248.9, 1299.2, 1349.4,
 1399.0, 1449.4, 1498.5, 1499.5, 1549.5, 1599.4, 1649.4, 1699.3,
 1749.6, 1798.9, 1848.8, 1898.7, 1948.8, 4916.0 ;

 PRES_QC =
  "1111111111111111111111111111111111111111111111111111111111411111111114" ;
```

For the test on the "pressure increasing test" (from Claudia)

```
PRES in our original R1900044_121.nc
  499.3,  549.3,  599.1,  649.3,  699.4, 1498.5, 4916.0,  855.5,
  899.5,  949.5,  999.2, 1049.0, 1099.6, 1149.2, 1199.4, 1248.9,
 1299.2, 1349.4, 1399.0, 1449.4, 1499.5, 1549.5, 1599.4, 1649.4,
 1699.3, 1749.6, 1798.9, 1848.8, 1898.7, 1948.8 ;
```

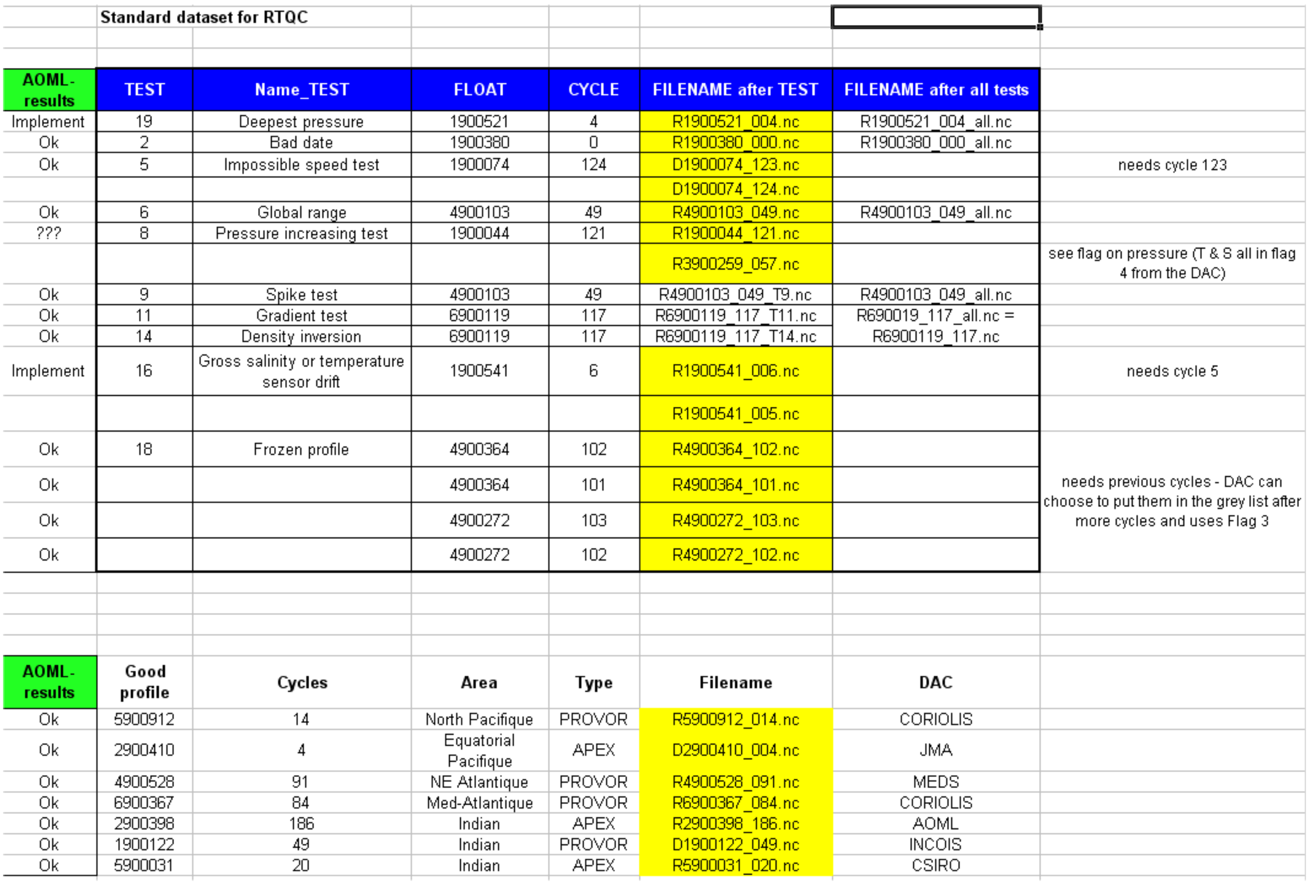
in the file provided for the checking of the QC performance:

499.3, 549.3, 599.1, 649.3, 699.4, 855.5, 899.5, 949.5,
999.2, 1049.0, 1099.6, 1149.2, 1199.4, 1248.9, 1299.2, 1349.4,
1399.0, 1449.4, 1498.5, 1499.5, 1549.5, 1599.4, 1649.4, 1699.3,
1749.6, 1798.9, 1848.8, 1898.7, 1948.8, 4916.0 ;

since the profiles have been sorted by pressure by someone the failure of the pressure increasing test can not be reproduced.

So we'll need a different file for the pressure increasing test. I suggest to take our original file R1900044_121.nc from a GDAC.

File of results : aomldataset.xls



Standard dataset for RTQC

AOML-results	TEST	Name_TEST	FLOAT	CYCLE	FILENAME after TEST	FILENAME after all tests	
Implement	19	Deepest pressure	1900521	4	R1900521_004.nc	R1900521_004_all.nc	
Ok	2	Bad date	1900380	0	R1900380_000.nc	R1900380_000_all.nc	
Ok	5	Impossible speed test	1900074	124	D1900074_123.nc		needs cycle 123
					D1900074_124.nc		
Ok	6	Global range	4900103	49	R4900103_049.nc	R4900103_049_all.nc	
???	8	Pressure increasing test	1900044	121	R1900044_121.nc		
					R3900259_057.nc		see flag on pressure (T & S all in flag 4 from the DAC)
Ok	9	Spike test	4900103	49	R4900103_049_T9.nc	R4900103_049_all.nc	
Ok	11	Gradient test	6900119	117	R6900119_117_T11.nc	R690019_117_all.nc = R6900119_117.nc	
Ok	14	Density inversion	6900119	117	R6900119_117_T14.nc		
Implement	16	Gross salinity or temperature sensor drift	1900541	6	R1900541_006.nc		needs cycle 5
					R1900541_005.nc		
Ok	18	Frozen profile	4900364	102	R4900364_102.nc		needs previous cycles - DAC can choose to put them in the grey list after more cycles and uses Flag 3
Ok			4900364	101	R4900364_101.nc		
Ok			4900272	103	R4900272_103.nc		
Ok			4900272	102	R4900272_102.nc		

AOML-results	Good profile	Cycles	Area	Type	Filename	DAC
Ok	5900912	14	North Pacifique	PROVOR	R5900912_014.nc	CORIOLIS
Ok	2900410	4	Equatorial Pacifique	APEX	D2900410_004.nc	JMA
Ok	4900528	91	NE Atlantique	PROVOR	R4900528_091.nc	MEDS
Ok	6900367	84	Med-Atlantique	PROVOR	R6900367_084.nc	CORIOLIS
Ok	2900398	186	Indian	APEX	R2900398_186.nc	AOML
Ok	1900122	49	Indian	PROVOR	D1900122_049.nc	INCOIS
Ok	5900031	20	Indian	APEX	R5900031_020.nc	CSIRO

1.2. BODC

Results sent by : Stephanie Contardo e-mail SCONT@wpo.nerc.ac.uk

There are 2 files:

a. QCcompar.doc shows the results of the comparison between Coriolis NetCDF files and those created by BODC after the tests.
b. QCtest_res shows the output display of the processing (failed tests) for each profile.

SC identified some errors in BODC tests which she has to correct. But there are some difference with the test dataset which she doesn't explain. Part of the reason may be that the profiles provided have been screened (?) and flagged accordingly.

Results :

**************** Deepest Pressure Test***
1900521 #4
T flags level 5 Coriolis: 4, BODC: 1 test failed?
T flags level 39 Coriolis: 4, BODC: 1 T = 6.8, global T test not failed
S flags level 5 Coriolis: 4, BODC: 1 test failed?
S flags level 38 Coriolis: 4, BODC: 1 test failed?
S flags level 40 Coriolis: 4, BODC: 1 test failed?

**************** Bad Date Test***
1900380 #0
NetCDF file not opened: /users/argo/scont/test_dataset/BODC_nc/R1900380_000.nc
The date being not valid, the Argos message couldn't be processed.

**************** Impossible Speed Test***
1900074 #124 D
Bad position has been detected, but flags aren't yet applied for position tests (Rebecca Mccreadie personal communication).

**************** Global Range / Spike Tests*************************************
4900103 #49
T flags level 13 Coriolis: 4, BODC: 1 T flags level 32 Coriolis: 4, BODC: 1
T flags level 25 Coriolis: 4, BODC: 1 T flags level 50 Coriolis: 1, BODC: 4
T flags level 29 Coriolis: 4, BODC: 1
A "up and down" density inversion test should have flagged #50 (as well as #49).
T flags level 54 Coriolis: 4, BODC: 1
S flags level 10 Coriolis: 4, BODC: 1 S flags level 32 Coriolis: 4, BODC: 1
S flags level 15 Coriolis: 4, BODC: 1 S flags level 37 Coriolis: 4, BODC: 1
S flags level 25 Coriolis: 4, BODC: 1 S flags level 50 Coriolis: 1, BODC: 4
S flags level 29 Coriolis: 4, BODC: 1
A "up and down" density inversion test should have flagged #50 (as well as #49).
S flags level 54 Coriolis: 4, BODC: 1 S flags level 69 Coriolis: 4, BODC: 1

**************** Good profile? **
1900044 #121
P flags level 12 Coriolis: 4, BODC: 1
T and S global range tests failed but BODC processing failed into flagging both P value when T and S global range tests fail.

**************** Pressure Increasing Test *************************************
1900144 #66
T flags level 19 Coriolis: 2, BODC: 1
T flags level 20 Coriolis: 2, BODC: 4
S flags level 20 Coriolis: 2, BODC: 4
Deepest pressure test failed, at level 20: flag '4' (even if T and S values are probably good)
**************** Pressure Increasing Test? ************************************
3900259 #57
P flags level 1 Coriolis: 1, BODC: 4 P flags level 24 Coriolis: 1, BODC: 4
P flags level 2 Coriolis: 1, BODC: 4 P flags level 25 Coriolis: 1, BODC: 4
P flags level 3 Coriolis: 1, BODC: 4 P flags level 26 Coriolis: 1, BODC: 4
P flags level 4 Coriolis: 1, BODC: 4 P flags level 27 Coriolis: 1, BODC: 4
P flags level 5 Coriolis: 1, BODC: 4 P flags level 28 Coriolis: 1, BODC: 4
P flags level 6 Coriolis: 1, BODC: 4 P flags level 29 Coriolis: 1, BODC: 4
P flags level 7 Coriolis: 1, BODC: 4 P flags level 30 Coriolis: 1, BODC: 4
P flags level 8 Coriolis: 1, BODC: 4 P flags level 31 Coriolis: 1, BODC: 4
P flags level 9 Coriolis: 1, BODC: 4 P flags level 32 Coriolis: 1, BODC: 4
P flags level 10 Coriolis: 1, BODC: 4 P flags level 33 Coriolis: 1, BODC: 4
P flags level 16 Coriolis: 1, BODC: 4 P flags level 34 Coriolis: 1, BODC: 4
P flags level 17 Coriolis: 1, BODC: 4 P flags level 35 Coriolis: 1, BODC: 4
P flags level 18 Coriolis: 1, BODC: 4 P flags level 36 Coriolis: 1, BODC: 4
P flags level 19 Coriolis: 1, BODC: 4 P flags level 37 Coriolis: 1, BODC: 4
P flags level 20 Coriolis: 1, BODC: 4 P flags level 38 Coriolis: 1, BODC: 4
P flags level 21 Coriolis: 1, BODC: 4 P flags level 39 Coriolis: 1, BODC: 4
P flags level 22 Coriolis: 1, BODC: 4 P flags level 40 Coriolis: 1, BODC: 4
P flags level 23 Coriolis: 1, BODC: 4 P flags level 41 Coriolis: 1, BODC: 4

P flags level 42 Coriolis: 1, BODC: 4
P flags level 43 Coriolis: 1, BODC: 4
P flags level 44 Coriolis: 1, BODC: 4
P flags level 45 Coriolis: 1, BODC: 4
P flags level 46 Coriolis: 1, BODC: 4
P flags level 47 Coriolis: 1, BODC: 4
P flags level 48 Coriolis: 1, BODC: 4
P flags level 49 Coriolis: 1, BODC: 4
P flags level 50 Coriolis: 1, BODC: 4
P flags level 51 Coriolis: 1, BODC: 4
P flags level 54 Coriolis: 1, BODC: 4
P flags level 61 Coriolis: 1, BODC: 4
P flags level 62 Coriolis: 1, BODC: 4
P flags level 63 Coriolis: 1, BODC: 4
I have to investigate why increasing pressure test failed level 1 to 63.
P flags level 67 Coriolis: 4, BODC: 1
T flags level 67 Coriolis: 4, BODC: 1
T flags level 69 Coriolis: 4, BODC: 1
T flags level 70 Coriolis: 4, BODC: 1
S flags level 69 Coriolis: 4, BODC: 1
S flags level 70 Coriolis: 4, BODC: 1

**************** Gradient + Density Inversion Tests ***************************
6900119 #117
T flags level 20 Coriolis: 4, BODC: 1
T flags level 22 Coriolis: 4, BODC: 1
T flags level 27 Coriolis: 4, BODC: 1
T flags level 30 Coriolis: 4, BODC: 1
T flags level 51 Coriolis: 4, BODC: 1
T flags level 61 Coriolis: 4, BODC: 1

S flags level 2 Coriolis: 1, BODC: 4
S flags level 3 Coriolis: 1, BODC: 4
S flags level 4 Coriolis: 1, BODC: 4
S flags level 5 Coriolis: 1, BODC: 4
S flags level 6 Coriolis: 1, BODC: 4
S flags level 7 Coriolis: 1, BODC: 4
S flags level 8 Coriolis: 1, BODC: 4
S flags level 9 Coriolis: 1, BODC: 4
S flags level 10 Coriolis: 1, BODC: 4
S flags level 11 Coriolis: 1, BODC: 4
S flags level 12 Coriolis: 1, BODC: 4
S flags level 13 Coriolis: 1, BODC: 4
S flags level 14 Coriolis: 1, BODC: 4
S flags level 15 Coriolis: 1, BODC: 4
S flags level 16 Coriolis: 1, BODC: 4
S flags level 17 Coriolis: 1, BODC: 4
S flags level 18 Coriolis: 1, BODC: 4
S flags level 19 Coriolis: 1, BODC: 4
S from level 1 to 38 failed regional “envelop test”: S should be between 22 and 38 psu at depths between 1100 and 3000.
S flags level 21 Coriolis: 4, BODC: 1
S flags level 28 Coriolis: 4, BODC: 1
S flags level 31 Coriolis: 4, BODC: 1
S flags level 50 Coriolis: 4, BODC: 1
S flags level 61 Coriolis: 4, BODC: 1
No gradient detected

**************** Gross Salinity or Temperature Sensor Drift Tests **************
1900541 #6
T flags level 121 Coriolis: 1, BODC: 4
T flags level 122 Coriolis: 1, BODC: 4
T flags level 123 Coriolis: 1, BODC: 4
Density inversion test failed levels 121 to 123.
S flags level 1 Coriolis: 3, BODC: 1
S flags level 2 Coriolis: 3, BODC: 1
S flags level 3 Coriolis: 3, BODC: 1
S flags level 4 Coriolis: 3, BODC: 1
S flags level 5 Coriolis: 3, BODC: 1
S flags level 6 Coriolis: 3, BODC: 1
S flags level 7 Coriolis: 3, BODC: 1
S flags level 8 Coriolis: 3, BODC: 1
S flags level 9 Coriolis: 3, BODC: 1
S flags level 10 Coriolis: 3, BODC: 1
S flags level 11 Coriolis: 3, BODC: 1
S flags level 12 Coriolis: 3, BODC: 1
S flags level 13 Coriolis: 3, BODC: 1
S flags level 14 Coriolis: 3, BODC: 1
S flags level 15 Coriolis: 3, BODC: 1
S flags level 16 Coriolis: 3, BODC: 1
S flags level 17 Coriolis: 3, BODC: 1
S flags level 18 Coriolis: 3, BODC: 1
S flags level 19 Coriolis: 3, BODC: 1
S flags level 20 Coriolis: 3, BODC: 1
S flags level 21 Coriolis: 3, BODC: 1
S flags level 22 Coriolis: 3, BODC: 1
S flags level 23 Coriolis: 3, BODC: 1
S flags level 24 Coriolis: 3, BODC: 1
S flags level 25 Coriolis: 3, BODC: 1
S flags level 26 Coriolis: 3, BODC: 1
S flags level 27 Coriolis: 3, BODC: 1
S flags level 28 Coriolis: 3, BODC: 1
S flags level 29 Coriolis: 3, BODC: 1
S flags level 30 Coriolis: 3, BODC: 1
S flags level 31 Coriolis: 3, BODC: 1
S flags level 32 Coriolis: 3, BODC: 1
S flags level 33 Coriolis: 3, BODC: 1
S flags level 34 Coriolis: 3, BODC: 1
S flags level 35 Coriolis: 3, BODC: 1
S flags level 36 Coriolis: 3, BODC: 1
S flags level 37 Coriolis: 3, BODC: 1
S flags level 38 Coriolis: 3, BODC: 1
S flags level 39 Coriolis: 3, BODC: 1
S flags level 40 Coriolis: 3, BODC: 1
S flags level 41 Coriolis: 3, BODC: 1
S flags level 42 Coriolis: 3, BODC: 1
S flags level 43 Coriolis: 3, BODC: 1
S flags level 44 Coriolis: 3, BODC: 1
S flags level 45 Coriolis: 3, BODC: 1
S flags level 46 Coriolis: 3, BODC: 1
S flags level 47 Coriolis: 3, BODC: 1
S flags level 48 Coriolis: 3, BODC: 1
S flags level 49 Coriolis: 3, BODC: 1
S flags level 50 Coriolis: 3, BODC: 1
S flags level 51 Coriolis: 3, BODC: 1
S flags level 52 Coriolis: 3, BODC: 1
S flags level 53 Coriolis: 3, BODC: 1
S flags level 54 Coriolis: 3, BODC: 1
S flags level 55 Coriolis: 3, BODC: 1
S flags level 56 Coriolis: 3, BODC: 1
S flags level 57 Coriolis: 3, BODC: 1
S flags level 58 Coriolis: 3, BODC: 1

S flags level 59	Coriolis: 3, BODC: 1
S flags level 60	Coriolis: 3, BODC: 1
S flags level 61	Coriolis: 3, BODC: 1
S flags level 62	Coriolis: 3, BODC: 1
S flags level 63	Coriolis: 3, BODC: 1
S flags level 64	Coriolis: 3, BODC: 1
S flags level 65	Coriolis: 3, BODC: 1
S flags level 66	Coriolis: 3, BODC: 1
S flags level 67	Coriolis: 3, BODC: 1
S flags level 68	Coriolis: 3, BODC: 1
S flags level 69	Coriolis: 3, BODC: 1
S flags level 70	Coriolis: 3, BODC: 1
S flags level 71	Coriolis: 3, BODC: 1
S flags level 72	Coriolis: 3, BODC: 1
S flags level 73	Coriolis: 3, BODC: 1
S flags level 74	Coriolis: 3, BODC: 1
S flags level 75	Coriolis: 3, BODC: 1
S flags level 76	Coriolis: 3, BODC: 1
S flags level 77	Coriolis: 3, BODC: 1
S flags level 78	Coriolis: 3, BODC: 1
S flags level 79	Coriolis: 3, BODC: 1
S flags level 80	Coriolis: 3, BODC: 1
S flags level 81	Coriolis: 3, BODC: 1
S flags level 82	Coriolis: 3, BODC: 1
S flags level 83	Coriolis: 3, BODC: 1
S flags level 84	Coriolis: 3, BODC: 1
S flags level 85	Coriolis: 3, BODC: 1
S flags level 86	Coriolis: 3, BODC: 1
S flags level 87	Coriolis: 3, BODC: 1
S flags level 88	Coriolis: 3, BODC: 1
S flags level 89	Coriolis: 3, BODC: 1
S flags level 90	Coriolis: 3, BODC: 1
S flags level 91	Coriolis: 3, BODC: 1
S flags level 92	Coriolis: 3, BODC: 1
S flags level 93	Coriolis: 3, BODC: 1
S flags level 94	Coriolis: 3, BODC: 1
S flags level 95	Coriolis: 3, BODC: 1
S flags level 96	Coriolis: 3, BODC: 1
S flags level 97	Coriolis: 3, BODC: 1
S flags level 98	Coriolis: 3, BODC: 1
S flags level 99	Coriolis: 3, BODC: 1
S flags level 100	Coriolis: 3, BODC: 1
S flags level 101	Coriolis: 3, BODC: 1
S flags level 102	Coriolis: 3, BODC: 1
S flags level 103	Coriolis: 3, BODC: 1
S flags level 104	Coriolis: 3, BODC: 1
S flags level 105	Coriolis: 3, BODC: 1
S flags level 106	Coriolis: 3, BODC: 1
S flags level 107	Coriolis: 3, BODC: 1
S flags level 108	Coriolis: 3, BODC: 1
S flags level 109	Coriolis: 3, BODC: 1
S flags level 110	Coriolis: 3, BODC: 1
S flags level 111	Coriolis: 3, BODC: 1
S flags level 112	Coriolis: 3, BODC: 1
S flags level 113	Coriolis: 3, BODC: 1
S flags level 114	Coriolis: 3, BODC: 1
S flags level 115	Coriolis: 3, BODC: 1
S flags level 116	Coriolis: 3, BODC: 1
S flags level 117	Coriolis: 3, BODC: 1
S flags level 118	Coriolis: 3, BODC: 1
S flags level 119	Coriolis: 3, BODC: 1
S flags level 120	Coriolis: 3, BODC: 1
S flags level 121	Coriolis: 3, BODC: 4
S flags level 122	Coriolis: 3, BODC: 4
S flags level 123	Coriolis: 3, BODC: 4

Density inversion test failed levels 121 to 123.
Drift not detected. Tolerance on the average T: 1, S:0.5.

**************** Frozen Test ***

4900364 #102

T flags level 1	Coriolis: 3, BODC: 1
T flags level 2	Coriolis: 3, BODC: 1
T flags level 3	Coriolis: 3, BODC: 1
T flags level 4	Coriolis: 3, BODC: 1
T flags level 5	Coriolis: 3, BODC: 1
T flags level 6	Coriolis: 3, BODC: 1
T flags level 7	Coriolis: 3, BODC: 1
T flags level 8	Coriolis: 3, BODC: 1
T flags level 9	Coriolis: 3, BODC: 1
T flags level 10	Coriolis: 3, BODC: 1
T flags level 11	Coriolis: 3, BODC: 1
T flags level 12	Coriolis: 3, BODC: 1
T flags level 13	Coriolis: 3, BODC: 1
T flags level 14	Coriolis: 3, BODC: 1
T flags level 15	Coriolis: 3, BODC: 1
T flags level 16	Coriolis: 3, BODC: 1
T flags level 17	Coriolis: 3, BODC: 1
T flags level 18	Coriolis: 3, BODC: 1
T flags level 19	Coriolis: 3, BODC: 1
T flags level 20	Coriolis: 3, BODC: 1
T flags level 21	Coriolis: 3, BODC: 1
T flags level 22	Coriolis: 3, BODC: 1
T flags level 23	Coriolis: 3, BODC: 1
T flags level 24	Coriolis: 3, BODC: 1
T flags level 25	Coriolis: 3, BODC: 1
T flags level 26	Coriolis: 3, BODC: 1
T flags level 27	Coriolis: 3, BODC: 1
T flags level 28	Coriolis: 3, BODC: 4
T flags level 29	Coriolis: 3, BODC: 4

Density inversion flagged ‘4’.

T flags level 30	Coriolis: 3, BODC: 1
T flags level 31	Coriolis: 3, BODC: 1
T flags level 32	Coriolis: 3, BODC: 1
T flags level 33	Coriolis: 3, BODC: 1
T flags level 34	Coriolis: 3, BODC: 1
T flags level 35	Coriolis: 3, BODC: 1
T flags level 36	Coriolis: 3, BODC: 1
T flags level 37	Coriolis: 3, BODC: 1
T flags level 38	Coriolis: 3, BODC: 1
T flags level 39	Coriolis: 3, BODC: 1
T flags level 40	Coriolis: 3, BODC: 1
T flags level 41	Coriolis: 3, BODC: 1

S flags level 1	Coriolis: 3, BODC: 1
S flags level 2	Coriolis: 3, BODC: 1
S flags level 3	Coriolis: 3, BODC: 1
S flags level 4	Coriolis: 3, BODC: 1
S flags level 5	Coriolis: 3, BODC: 1
S flags level 6	Coriolis: 3, BODC: 1
S flags level 7	Coriolis: 3, BODC: 1
S flags level 8	Coriolis: 3, BODC: 1
S flags level 9	Coriolis: 3, BODC: 1
S flags level 10	Coriolis: 3, BODC: 1
S flags level 11	Coriolis: 3, BODC: 1
S flags level 12	Coriolis: 3, BODC: 1
S flags level 13	Coriolis: 3, BODC: 1
S flags level 14	Coriolis: 3, BODC: 1
S flags level 15	Coriolis: 3, BODC: 1
S flags level 16	Coriolis: 3, BODC: 1

S flags level 17 Coriolis: 3, BODC: 1
S flags level 18 Coriolis: 3, BODC: 1
S flags level 19 Coriolis: 3, BODC: 1
S flags level 20 Coriolis: 3, BODC: 1
S flags level 21 Coriolis: 3, BODC: 1
S flags level 22 Coriolis: 3, BODC: 1
S flags level 23 Coriolis: 3, BODC: 1
S flags level 24 Coriolis: 3, BODC: 1
S flags level 25 Coriolis: 3, BODC: 1
S flags level 26 Coriolis: 3, BODC: 1
S flags level 27 Coriolis: 3, BODC: 1
S flags level 28 Coriolis: 3, BODC: 4
S flags level 29 Coriolis: 3, BODC: 4

Density inversion flagged ‘4’.

S flags level 30 Coriolis: 3, BODC: 1
S flags level 31 Coriolis: 3, BODC: 1
S flags level 32 Coriolis: 3, BODC: 1
S flags level 33 Coriolis: 3, BODC: 1
S flags level 34 Coriolis: 3, BODC: 1
S flags level 35 Coriolis: 3, BODC: 1
S flags level 36 Coriolis: 3, BODC: 1
S flags level 37 Coriolis: 3, BODC: 1
S flags level 38 Coriolis: 3, BODC: 1
S flags level 39 Coriolis: 3, BODC: 1
S flags level 40 Coriolis: 3, BODC: 1
S flags level 41 Coriolis: 3, BODC: 1

Frozen profile not detected. Tolerance values used in BODC slightly different from those in QC manual.

**************** Frozen Test **

4900272 #103

T flags level 1 Coriolis: 3, BODC: 1
T flags level 2 Coriolis: 3, BODC: 1
T flags level 3 Coriolis: 3, BODC: 1
T flags level 4 Coriolis: 3, BODC: 1
T flags level 5 Coriolis: 3, BODC: 1
T flags level 6 Coriolis: 3, BODC: 1
T flags level 7 Coriolis: 3, BODC: 1
T flags level 8 Coriolis: 3, BODC: 1
T flags level 9 Coriolis: 3, BODC: 1
T flags level 10 Coriolis: 3, BODC: 1
T flags level 11 Coriolis: 3, BODC: 1
T flags level 12 Coriolis: 3, BODC: 1
T flags level 13 Coriolis: 3, BODC: 1
T flags level 14 Coriolis: 3, BODC: 1
T flags level 15 Coriolis: 3, BODC: 1
T flags level 16 Coriolis: 3, BODC: 1
T flags level 17 Coriolis: 3, BODC: 1
T flags level 18 Coriolis: 3, BODC: 1
T flags level 19 Coriolis: 3, BODC: 1
T flags level 20 Coriolis: 3, BODC: 1
T flags level 21 Coriolis: 3, BODC: 1
T flags level 22 Coriolis: 3, BODC: 1
T flags level 23 Coriolis: 3, BODC: 1
T flags level 24 Coriolis: 3, BODC: 1
T flags level 25 Coriolis: 3, BODC: 1
T flags level 26 Coriolis: 3, BODC: 1
T flags level 27 Coriolis: 3, BODC: 1
T flags level 28 Coriolis: 3, BODC: 1
T flags level 29 Coriolis: 3, BODC: 1
T flags level 30 Coriolis: 3, BODC: 1
T flags level 31 Coriolis: 3, BODC: 1
T flags level 32 Coriolis: 3, BODC: 1
T flags level 33 Coriolis: 3, BODC: 1
T flags level 34 Coriolis: 3, BODC: 1
T flags level 35 Coriolis: 3, BODC: 1
T flags level 36 Coriolis: 3, BODC: 1
T flags level 37 Coriolis: 3, BODC: 1
T flags level 38 Coriolis: 3, BODC: 1
T flags level 39 Coriolis: 3, BODC: 1
T flags level 40 Coriolis: 3, BODC: 1
T flags level 41 Coriolis: 3, BODC: 1
T flags level 42 Coriolis: 3, BODC: 1
T flags level 43 Coriolis: 3, BODC: 1
T flags level 44 Coriolis: 3, BODC: 1
T flags level 45 Coriolis: 3, BODC: 1
T flags level 46 Coriolis: 3, BODC: 1
T flags level 47 Coriolis: 3, BODC: 1
T flags level 48 Coriolis: 3, BODC: 1
T flags level 49 Coriolis: 3, BODC: 1
T flags level 50 Coriolis: 3, BODC: 1
T flags level 51 Coriolis: 3, BODC: 1
T flags level 52 Coriolis: 3, BODC: 1
T flags level 53 Coriolis: 3, BODC: 1
T flags level 54 Coriolis: 3, BODC: 1
T flags level 55 Coriolis: 3, BODC: 1
T flags level 56 Coriolis: 3, BODC: 1
T flags level 57 Coriolis: 3, BODC: 1
T flags level 58 Coriolis: 3, BODC: 1
T flags level 59 Coriolis: 3, BODC: 1
T flags level 60 Coriolis: 3, BODC: 1
T flags level 61 Coriolis: 3, BODC: 1
T flags level 62 Coriolis: 3, BODC: 1
T flags level 63 Coriolis: 3, BODC: 1
T flags level 64 Coriolis: 3, BODC: 1
T flags level 65 Coriolis: 3, BODC: 1
T flags level 66 Coriolis: 3, BODC: 1
T flags level 67 Coriolis: 3, BODC: 1
T flags level 68 Coriolis: 3, BODC: 1
T flags level 69 Coriolis: 3, BODC: 1
T flags level 70 Coriolis: 3, BODC: 1
T flags level 71 Coriolis: 3, BODC: 1
T flags level 72 Coriolis: 3, BODC: 1
T flags level 73 Coriolis: 3, BODC: 1
T flags level 74 Coriolis: 3, BODC: 1
T flags level 75 Coriolis: 3, BODC: 1
T flags level 76 Coriolis: 3, BODC: 1
T flags level 77 Coriolis: 3, BODC: 1
T flags level 78 Coriolis: 3, BODC: 1
T flags level 79 Coriolis: 3, BODC: 1
T flags level 80 Coriolis: 3, BODC: 1
T flags level 81 Coriolis: 3, BODC: 1
T flags level 82 Coriolis: 3, BODC: 1
T flags level 83 Coriolis: 3, BODC: 1
T flags level 84 Coriolis: 3, BODC: 1
T flags level 85 Coriolis: 3, BODC: 1
T flags level 86 Coriolis: 3, BODC: 1
T flags level 87 Coriolis: 3, BODC: 1
T flags level 88 Coriolis: 3, BODC: 1
T flags level 89 Coriolis: 3, BODC: 1
T flags level 90 Coriolis: 3, BODC: 1
T flags level 91 Coriolis: 3, BODC: 1
T flags level 92 Coriolis: 3, BODC: 1
T flags level 93 Coriolis: 3, BODC: 1
T flags level 94 Coriolis: 3, BODC: 1
T flags level 95 Coriolis: 3, BODC: 1
T flags level 96 Coriolis: 3, BODC: 1
T flags level 97 Coriolis: 3, BODC: 1
T flags level 98 Coriolis: 3, BODC: 1
T flags level 99 Coriolis: 3, BODC: 1
T flags level 100 Coriolis: 3, BODC: 1
T flags level 101 Coriolis: 3, BODC: 1
T flags level 102 Coriolis: 3, BODC: 1
T flags level 103 Coriolis: 3, BODC: 1
T flags level 104 Coriolis: 3, BODC: 1
T flags level 105 Coriolis: 3, BODC: 1
T flags level 106 Coriolis: 3, BODC: 1

T flags level 107	Coriolis: 3, BODC: 1
T flags level 108	Coriolis: 3, BODC: 1
T flags level 109	Coriolis: 3, BODC: 1
T flags level 110	Coriolis: 3, BODC: 1
T flags level 111	Coriolis: 3, BODC: 1
T flags level 112	Coriolis: 3, BODC: 1
T flags level 113	Coriolis: 3, BODC: 1
T flags level 114	Coriolis: 3, BODC: 1
T flags level 115	Coriolis: 3, BODC: 1
T flags level 116	Coriolis: 3, BODC: 1
T flags level 117	Coriolis: 3, BODC: 1
T flags level 118	Coriolis: 3, BODC: 1
T flags level 119	Coriolis: 3, BODC: 1
T flags level 120	Coriolis: 3, BODC: 1
T flags level 121	Coriolis: 3, BODC: 1
T flags level 122	Coriolis: 3, BODC: 1
T flags level 123	Coriolis: 3, BODC: 1
T flags level 124	Coriolis: 3, BODC: 1
T flags level 125	Coriolis: 3, BODC: 1
T flags level 126	Coriolis: 3, BODC: 1
T flags level 127	Coriolis: 3, BODC: 1
T flags level 128	Coriolis: 3, BODC: 1
T flags level 129	Coriolis: 3, BODC: 1
T flags level 130	Coriolis: 3, BODC: 1
T flags level 131	Coriolis: 3, BODC: 1
T flags level 132	Coriolis: 3, BODC: 1
T flags level 133	Coriolis: 3, BODC: 1
T flags level 134	Coriolis: 3, BODC: 1
T flags level 135	Coriolis: 3, BODC: 1
T flags level 136	Coriolis: 3, BODC: 1
T flags level 137	Coriolis: 3, BODC: 1
T flags level 138	Coriolis: 3, BODC: 1
T flags level 139	Coriolis: 3, BODC: 1
T flags level 140	Coriolis: 3, BODC: 1
T flags level 141	Coriolis: 3, BODC: 1
T flags level 142	Coriolis: 3, BODC: 1
T flags level 143	Coriolis: 3, BODC: 1
T flags level 144	Coriolis: 3, BODC: 1
T flags level 145	Coriolis: 3, BODC: 1
T flags level 146	Coriolis: 3, BODC: 1
T flags level 147	Coriolis: 3, BODC: 1
T flags level 148	Coriolis: 3, BODC: 1
T flags level 149	Coriolis: 3, BODC: 1
T flags level 150	Coriolis: 3, BODC: 1
T flags level 151	Coriolis: 3, BODC: 1
T flags level 152	Coriolis: 3, BODC: 1
T flags level 153	Coriolis: 3, BODC: 1
T flags level 154	Coriolis: 3, BODC: 1
T flags level 155	Coriolis: 3, BODC: 1
T flags level 156	Coriolis: 3, BODC: 1
T flags level 157	Coriolis: 3, BODC: 1
T flags level 158	Coriolis: 3, BODC: 1
T flags level 159	Coriolis: 3, BODC: 1
T flags level 160	Coriolis: 3, BODC: 1
T flags level 161	Coriolis: 3, BODC: 1
T flags level 162	Coriolis: 3, BODC: 1
T flags level 163	Coriolis: 3, BODC: 1
T flags level 164	Coriolis: 3, BODC: 1
T flags level 165	Coriolis: 3, BODC: 1
T flags level 166	Coriolis: 3, BODC: 1
T flags level 167	Coriolis: 3, BODC: 1
T flags level 168	Coriolis: 3, BODC: 1
T flags level 169	Coriolis: 3, BODC: 1
T flags level 170	Coriolis: 3, BODC: 1
T flags level 171	Coriolis: 3, BODC: 1
T flags level 172	Coriolis: 3, BODC: 1
T flags level 173	Coriolis: 3, BODC: 1
T flags level 174	Coriolis: 3, BODC: 1
T flags level 175	Coriolis: 3, BODC: 1
T flags level 176	Coriolis: 3, BODC: 1
T flags level 177	Coriolis: 3, BODC: 1
T flags level 178	Coriolis: 3, BODC: 1
T flags level 179	Coriolis: 3, BODC: 1
T flags level 180	Coriolis: 3, BODC: 1
T flags level 181	Coriolis: 3, BODC: 1
T flags level 182	Coriolis: 3, BODC: 1
T flags level 183	Coriolis: 3, BODC: 1
T flags level 184	Coriolis: 3, BODC: 1
T flags level 185	Coriolis: 3, BODC: 1
T flags level 186	Coriolis: 3, BODC: 1
T flags level 187	Coriolis: 3, BODC: 1
T flags level 188	Coriolis: 3, BODC: 1
T flags level 189	Coriolis: 3, BODC: 1
T flags level 190	Coriolis: 3, BODC: 1
T flags level 191	Coriolis: 3, BODC: 1
T flags level 192	Coriolis: 3, BODC: 1
T flags level 193	Coriolis: 3, BODC: 1
T flags level 194	Coriolis: 3, BODC: 1
T flags level 195	Coriolis: 3, BODC: 1
T flags level 196	Coriolis: 3, BODC: 1
T flags level 197	Coriolis: 3, BODC: 1
T flags level 198	Coriolis: 3, BODC: 1
T flags level 199	Coriolis: 3, BODC: 1
T flags level 200	Coriolis: 3, BODC: 1
T flags level 201	Coriolis: 3, BODC: 1
T flags level 202	Coriolis: 3, BODC: 1
T flags level 203	Coriolis: 3, BODC: 1
T flags level 204	Coriolis: 3, BODC: 1
T flags level 205	Coriolis: 3, BODC: 1
T flags level 206	Coriolis: 3, BODC: 1
T flags level 207	Coriolis: 3, BODC: 1
T flags level 208	Coriolis: 3, BODC: 1
T flags level 209	Coriolis: 3, BODC: 1
T flags level 210	Coriolis: 3, BODC: 1
T flags level 211	Coriolis: 3, BODC: 1
T flags level 212	Coriolis: 3, BODC: 1
T flags level 213	Coriolis: 3, BODC: 1
T flags level 214	Coriolis: 3, BODC: 1
T flags level 215	Coriolis: 3, BODC: 1
T flags level 216	Coriolis: 3, BODC: 1
T flags level 217	Coriolis: 3, BODC: 1
T flags level 218	Coriolis: 3, BODC: 1
T flags level 219	Coriolis: 3, BODC: 1
T flags level 220	Coriolis: 3, BODC: 1
T flags level 221	Coriolis: 3, BODC: 1
T flags level 222	Coriolis: 3, BODC: 1
T flags level 223	Coriolis: 3, BODC: 1
T flags level 224	Coriolis: 3, BODC: 1
T flags level 225	Coriolis: 3, BODC: 1
T flags level 226	Coriolis: 3, BODC: 1
T flags level 227	Coriolis: 3, BODC: 1
T flags level 228	Coriolis: 3, BODC: 1
T flags level 229	Coriolis: 3, BODC: 1
T flags level 230	Coriolis: 3, BODC: 1
T flags level 231	Coriolis: 3, BODC: 1
T flags level 232	Coriolis: 3, BODC: 1
T flags level 233	Coriolis: 3, BODC: 1
T flags level 234	Coriolis: 3, BODC: 1
T flags level 235	Coriolis: 3, BODC: 1
T flags level 236	Coriolis: 3, BODC: 1
T flags level 237	Coriolis: 3, BODC: 1
T flags level 238	Coriolis: 3, BODC: 1
T flags level 239	Coriolis: 3, BODC: 1
T flags level 240	Coriolis: 3, BODC: 1
T flags level 241	Coriolis: 3, BODC: 1
T flags level 242	Coriolis: 3, BODC: 1
T flags level 243	Coriolis: 3, BODC: 1
T flags level 244	Coriolis: 3, BODC: 1
T flags level 245	Coriolis: 3, BODC: 1
T flags level 246	Coriolis: 3, BODC: 1
T flags level 247	Coriolis: 3, BODC: 1
T flags level 248	Coriolis: 3, BODC: 1
T flags level 249	Coriolis: 3, BODC: 1
T flags level 250	Coriolis: 3, BODC: 1
T flags level 251	Coriolis: 3, BODC: 1
T flags level 252	Coriolis: 3, BODC: 1
T flags level 253	Coriolis: 3, BODC: 1
T flags level 254	Coriolis: 3, BODC: 1

T flags level 255	Coriolis: 3, BODC: 1
T flags level 256	Coriolis: 3, BODC: 1
T flags level 257	Coriolis: 3, BODC: 1
T flags level 258	Coriolis: 3, BODC: 1
T flags level 259	Coriolis: 3, BODC: 1
T flags level 260	Coriolis: 3, BODC: 1
T flags level 261	Coriolis: 3, BODC: 1
T flags level 262	Coriolis: 3, BODC: 1
T flags level 263	Coriolis: 3, BODC: 1
T flags level 264	Coriolis: 3, BODC: 1
T flags level 265	Coriolis: 3, BODC: 1
T flags level 266	Coriolis: 3, BODC: 1
T flags level 267	Coriolis: 3, BODC: 1
T flags level 268	Coriolis: 3, BODC: 1
T flags level 269	Coriolis: 3, BODC: 1
T flags level 270	Coriolis: 3, BODC: 1
T flags level 271	Coriolis: 3, BODC: 1
T flags level 272	Coriolis: 3, BODC: 1
T flags level 273	Coriolis: 3, BODC: 1
T flags level 274	Coriolis: 3, BODC: 1
T flags level 275	Coriolis: 3, BODC: 1
T flags level 276	Coriolis: 3, BODC: 1
T flags level 277	Coriolis: 3, BODC: 1
T flags level 278	Coriolis: 3, BODC: 1
T flags level 279	Coriolis: 3, BODC: 1
T flags level 280	Coriolis: 3, BODC: 1
T flags level 281	Coriolis: 3, BODC: 1
T flags level 282	Coriolis: 3, BODC: 1
T flags level 283	Coriolis: 3, BODC: 1
T flags level 284	Coriolis: 3, BODC: 1
T flags level 285	Coriolis: 3, BODC: 1
T flags level 286	Coriolis: 3, BODC: 1
T flags level 287	Coriolis: 3, BODC: 1
T flags level 288	Coriolis: 3, BODC: 1
T flags level 289	Coriolis: 3, BODC: 1
T flags level 290	Coriolis: 3, BODC: 1
T flags level 291	Coriolis: 3, BODC: 1
T flags level 292	Coriolis: 3, BODC: 1
T flags level 293	Coriolis: 3, BODC: 1
T flags level 294	Coriolis: 3, BODC: 1
T flags level 295	Coriolis: 3, BODC: 1
T flags level 296	Coriolis: 3, BODC: 1
T flags level 297	Coriolis: 3, BODC: 1
T flags level 298	Coriolis: 3, BODC: 1
T flags level 299	Coriolis: 3, BODC: 1
T flags level 300	Coriolis: 3, BODC: 1
T flags level 301	Coriolis: 3, BODC: 1
T flags level 302	Coriolis: 3, BODC: 1
T flags level 303	Coriolis: 3, BODC: 1
T flags level 304	Coriolis: 3, BODC: 1
T flags level 305	Coriolis: 3, BODC: 1
T flags level 306	Coriolis: 3, BODC: 1
T flags level 307	Coriolis: 3, BODC: 1
T flags level 308	Coriolis: 3, BODC: 1
T flags level 309	Coriolis: 3, BODC: 1
T flags level 310	Coriolis: 3, BODC: 1
T flags level 311	Coriolis: 3, BODC: 1
T flags level 312	Coriolis: 3, BODC: 1
T flags level 313	Coriolis: 3, BODC: 1
T flags level 314	Coriolis: 3, BODC: 1
T flags level 315	Coriolis: 3, BODC: 1
T flags level 316	Coriolis: 3, BODC: 1
T flags level 317	Coriolis: 3, BODC: 1
T flags level 318	Coriolis: 3, BODC: 1
T flags level 319	Coriolis: 3, BODC: 1
T flags level 320	Coriolis: 3, BODC: 1
T flags level 321	Coriolis: 3, BODC: 1
T flags level 322	Coriolis: 3, BODC: 1
T flags level 323	Coriolis: 3, BODC: 1
T flags level 324	Coriolis: 3, BODC: 1
T flags level 325	Coriolis: 3, BODC: 1
T flags level 326	Coriolis: 3, BODC: 1
T flags level 327	Coriolis: 3, BODC: 1
T flags level 328	Coriolis: 3, BODC: 1
T flags level 329	Coriolis: 3, BODC: 1
T flags level 330	Coriolis: 3, BODC: 1
T flags level 331	Coriolis: 3, BODC: 1
T flags level 332	Coriolis: 3, BODC: 1
T flags level 333	Coriolis: 3, BODC: 1
T flags level 334	Coriolis: 3, BODC: 1
T flags level 335	Coriolis: 3, BODC: 1
T flags level 336	Coriolis: 3, BODC: 1
T flags level 337	Coriolis: 3, BODC: 1
T flags level 338	Coriolis: 3, BODC: 1
T flags level 339	Coriolis: 3, BODC: 1
T flags level 340	Coriolis: 3, BODC: 1
T flags level 341	Coriolis: 3, BODC: 1
T flags level 342	Coriolis: 3, BODC: 1
T flags level 343	Coriolis: 3, BODC: 1
T flags level 344	Coriolis: 3, BODC: 1
T flags level 345	Coriolis: 3, BODC: 1
T flags level 346	Coriolis: 3, BODC: 1
T flags level 347	Coriolis: 3, BODC: 1
T flags level 348	Coriolis: 3, BODC: 1
T flags level 349	Coriolis: 3, BODC: 1
T flags level 350	Coriolis: 3, BODC: 1
T flags level 351	Coriolis: 3, BODC: 1
T flags level 352	Coriolis: 3, BODC: 1
T flags level 353	Coriolis: 3, BODC: 1
T flags level 354	Coriolis: 3, BODC: 1
T flags level 355	Coriolis: 3, BODC: 1
T flags level 356	Coriolis: 3, BODC: 1
T flags level 357	Coriolis: 3, BODC: 1
T flags level 358	Coriolis: 3, BODC: 1
T flags level 359	Coriolis: 3, BODC: 1
T flags level 360	Coriolis: 3, BODC: 1
T flags level 361	Coriolis: 3, BODC: 1
T flags level 362	Coriolis: 3, BODC: 1
T flags level 363	Coriolis: 3, BODC: 1
T flags level 364	Coriolis: 3, BODC: 1
T flags level 365	Coriolis: 3, BODC: 1
T flags level 366	Coriolis: 3, BODC: 1
T flags level 367	Coriolis: 3, BODC: 1
T flags level 368	Coriolis: 3, BODC: 1
T flags level 369	Coriolis: 3, BODC: 1
T flags level 370	Coriolis: 3, BODC: 1
T flags level 371	Coriolis: 3, BODC: 1
T flags level 372	Coriolis: 3, BODC: 1
T flags level 373	Coriolis: 3, BODC: 1
T flags level 374	Coriolis: 3, BODC: 1
T flags level 375	Coriolis: 3, BODC: 1
T flags level 376	Coriolis: 3, BODC: 1
T flags level 377	Coriolis: 3, BODC: 1
T flags level 378	Coriolis: 3, BODC: 1
T flags level 379	Coriolis: 3, BODC: 1
T flags level 380	Coriolis: 3, BODC: 1
T flags level 381	Coriolis: 3, BODC: 1
T flags level 382	Coriolis: 3, BODC: 1
T flags level 383	Coriolis: 3, BODC: 1
T flags level 384	Coriolis: 3, BODC: 1
T flags level 385	Coriolis: 3, BODC: 1
T flags level 386	Coriolis: 3, BODC: 1
T flags level 387	Coriolis: 3, BODC: 1
T flags level 388	Coriolis: 3, BODC: 1
T flags level 389	Coriolis: 3, BODC: 1
T flags level 390	Coriolis: 3, BODC: 1
T flags level 391	Coriolis: 3, BODC: 1
T flags level 392	Coriolis: 3, BODC: 1
T flags level 393	Coriolis: 3, BODC: 1
T flags level 394	Coriolis: 3, BODC: 1
T flags level 395	Coriolis: 3, BODC: 1
T flags level 396	Coriolis: 3, BODC: 1
T flags level 397	Coriolis: 3, BODC: 1
T flags level 398	Coriolis: 3, BODC: 1
T flags level 399	Coriolis: 3, BODC: 1
T flags level 400	Coriolis: 3, BODC: 1
T flags level 401	Coriolis: 3, BODC: 1
T flags level 402	Coriolis: 3, BODC: 1

T flags level 403	Coriolis: 3, BODC: 1
T flags level 404	Coriolis: 3, BODC: 1
T flags level 405	Coriolis: 3, BODC: 1
T flags level 406	Coriolis: 3, BODC: 1
T flags level 407	Coriolis: 3, BODC: 1
T flags level 408	Coriolis: 3, BODC: 1
T flags level 409	Coriolis: 3, BODC: 1
S flags level 1	Coriolis: 3, BODC: 1
S flags level 2	Coriolis: 3, BODC: 1
S flags level 3	Coriolis: 3, BODC: 1
S flags level 4	Coriolis: 3, BODC: 1
S flags level 5	Coriolis: 3, BODC: 1
S flags level 6	Coriolis: 3, BODC: 1
S flags level 7	Coriolis: 3, BODC: 1
S flags level 8	Coriolis: 3, BODC: 1
S flags level 9	Coriolis: 3, BODC: 1
S flags level 10	Coriolis: 3, BODC: 1
S flags level 11	Coriolis: 3, BODC: 1
S flags level 12	Coriolis: 3, BODC: 1
S flags level 13	Coriolis: 3, BODC: 1
S flags level 14	Coriolis: 3, BODC: 1
S flags level 15	Coriolis: 3, BODC: 1
S flags level 16	Coriolis: 3, BODC: 1
S flags level 17	Coriolis: 3, BODC: 1
S flags level 18	Coriolis: 3, BODC: 1
S flags level 19	Coriolis: 3, BODC: 1
S flags level 20	Coriolis: 3, BODC: 1
S flags level 21	Coriolis: 3, BODC: 1
S flags level 22	Coriolis: 3, BODC: 1
S flags level 23	Coriolis: 3, BODC: 1
S flags level 24	Coriolis: 3, BODC: 1
S flags level 25	Coriolis: 3, BODC: 1
S flags level 26	Coriolis: 3, BODC: 1
S flags level 27	Coriolis: 3, BODC: 1
S flags level 28	Coriolis: 3, BODC: 1
S flags level 29	Coriolis: 3, BODC: 1
S flags level 30	Coriolis: 3, BODC: 1
S flags level 31	Coriolis: 3, BODC: 1
S flags level 32	Coriolis: 3, BODC: 1
S flags level 33	Coriolis: 3, BODC: 1
S flags level 34	Coriolis: 3, BODC: 1
S flags level 35	Coriolis: 3, BODC: 1
S flags level 36	Coriolis: 3, BODC: 1
S flags level 37	Coriolis: 3, BODC: 1
S flags level 38	Coriolis: 3, BODC: 1
S flags level 39	Coriolis: 3, BODC: 1
S flags level 40	Coriolis: 3, BODC: 1
S flags level 41	Coriolis: 3, BODC: 1
S flags level 42	Coriolis: 3, BODC: 1
S flags level 43	Coriolis: 3, BODC: 1
S flags level 44	Coriolis: 3, BODC: 1
S flags level 45	Coriolis: 3, BODC: 1
S flags level 46	Coriolis: 3, BODC: 1
S flags level 47	Coriolis: 3, BODC: 1
S flags level 48	Coriolis: 3, BODC: 1
S flags level 49	Coriolis: 3, BODC: 1
S flags level 50	Coriolis: 3, BODC: 1
S flags level 51	Coriolis: 3, BODC: 1
S flags level 52	Coriolis: 3, BODC: 1
S flags level 53	Coriolis: 3, BODC: 1
S flags level 54	Coriolis: 3, BODC: 1
S flags level 55	Coriolis: 3, BODC: 1
S flags level 56	Coriolis: 3, BODC: 1
S flags level 57	Coriolis: 3, BODC: 1
S flags level 58	Coriolis: 3, BODC: 1
S flags level 59	Coriolis: 3, BODC: 1
S flags level 60	Coriolis: 3, BODC: 1
S flags level 61	Coriolis: 3, BODC: 1
S flags level 62	Coriolis: 3, BODC: 1
S flags level 63	Coriolis: 3, BODC: 1
S flags level 64	Coriolis: 3, BODC: 1
S flags level 65	Coriolis: 3, BODC: 1
S flags level 66	Coriolis: 3, BODC: 1
S flags level 67	Coriolis: 3, BODC: 1
S flags level 68	Coriolis: 3, BODC: 1
S flags level 69	Coriolis: 3, BODC: 1
S flags level 70	Coriolis: 3, BODC: 1
S flags level 71	Coriolis: 3, BODC: 1
S flags level 72	Coriolis: 3, BODC: 1
S flags level 73	Coriolis: 3, BODC: 1
S flags level 74	Coriolis: 3, BODC: 1
S flags level 75	Coriolis: 3, BODC: 1
S flags level 76	Coriolis: 3, BODC: 1
S flags level 77	Coriolis: 3, BODC: 1
S flags level 78	Coriolis: 3, BODC: 1
S flags level 79	Coriolis: 3, BODC: 1
S flags level 80	Coriolis: 3, BODC: 1
S flags level 81	Coriolis: 3, BODC: 1
S flags level 82	Coriolis: 3, BODC: 1
S flags level 83	Coriolis: 3, BODC: 1
S flags level 84	Coriolis: 3, BODC: 1
S flags level 85	Coriolis: 3, BODC: 1
S flags level 86	Coriolis: 3, BODC: 1
S flags level 87	Coriolis: 3, BODC: 1
S flags level 88	Coriolis: 3, BODC: 1
S flags level 89	Coriolis: 3, BODC: 1
S flags level 90	Coriolis: 3, BODC: 1
S flags level 91	Coriolis: 3, BODC: 1
S flags level 92	Coriolis: 3, BODC: 1
S flags level 93	Coriolis: 3, BODC: 1
S flags level 94	Coriolis: 3, BODC: 1
S flags level 95	Coriolis: 3, BODC: 1
S flags level 96	Coriolis: 3, BODC: 1
S flags level 97	Coriolis: 3, BODC: 1
S flags level 98	Coriolis: 3, BODC: 1
S flags level 99	Coriolis: 3, BODC: 1
S flags level 100	Coriolis: 3, BODC: 1
S flags level 101	Coriolis: 3, BODC: 1
S flags level 102	Coriolis: 3, BODC: 1
S flags level 103	Coriolis: 3, BODC: 1
S flags level 104	Coriolis: 3, BODC: 1
S flags level 105	Coriolis: 3, BODC: 1
S flags level 106	Coriolis: 3, BODC: 1
S flags level 107	Coriolis: 3, BODC: 1
S flags level 108	Coriolis: 3, BODC: 1
S flags level 109	Coriolis: 3, BODC: 1
S flags level 110	Coriolis: 3, BODC: 1
S flags level 111	Coriolis: 3, BODC: 1
S flags level 112	Coriolis: 3, BODC: 1
S flags level 113	Coriolis: 3, BODC: 1
S flags level 114	Coriolis: 3, BODC: 1
S flags level 115	Coriolis: 3, BODC: 1
S flags level 116	Coriolis: 3, BODC: 1
S flags level 117	Coriolis: 3, BODC: 1
S flags level 118	Coriolis: 3, BODC: 1
S flags level 119	Coriolis: 3, BODC: 1
S flags level 120	Coriolis: 3, BODC: 1
S flags level 121	Coriolis: 3, BODC: 1
S flags level 122	Coriolis: 3, BODC: 1
S flags level 123	Coriolis: 3, BODC: 1
S flags level 124	Coriolis: 3, BODC: 1
S flags level 125	Coriolis: 3, BODC: 1
S flags level 126	Coriolis: 3, BODC: 1
S flags level 127	Coriolis: 3, BODC: 1
S flags level 128	Coriolis: 3, BODC: 1
S flags level 129	Coriolis: 3, BODC: 1
S flags level 130	Coriolis: 3, BODC: 1
S flags level 131	Coriolis: 3, BODC: 1
S flags level 132	Coriolis: 3, BODC: 1
S flags level 133	Coriolis: 3, BODC: 1
S flags level 134	Coriolis: 3, BODC: 1
S flags level 135	Coriolis: 3, BODC: 1
S flags level 136	Coriolis: 3, BODC: 1
S flags level 137	Coriolis: 3, BODC: 1
S flags level 138	Coriolis: 3, BODC: 1
S flags level 139	Coriolis: 3, BODC: 1
S flags level 140	Coriolis: 3, BODC: 1
S flags level 141	Coriolis: 3, BODC: 1

S flags level 142	Coriolis: 3, BODC: 1
S flags level 143	Coriolis: 3, BODC: 1
S flags level 144	Coriolis: 3, BODC: 1
S flags level 145	Coriolis: 3, BODC: 1
S flags level 146	Coriolis: 3, BODC: 1
S flags level 147	Coriolis: 3, BODC: 1
S flags level 148	Coriolis: 3, BODC: 1
S flags level 149	Coriolis: 3, BODC: 1
S flags level 150	Coriolis: 3, BODC: 1
S flags level 151	Coriolis: 3, BODC: 1
S flags level 152	Coriolis: 3, BODC: 1
S flags level 153	Coriolis: 3, BODC: 1
S flags level 154	Coriolis: 3, BODC: 1
S flags level 155	Coriolis: 3, BODC: 1
S flags level 156	Coriolis: 3, BODC: 1
S flags level 157	Coriolis: 3, BODC: 1
S flags level 158	Coriolis: 3, BODC: 1
S flags level 159	Coriolis: 3, BODC: 1
S flags level 160	Coriolis: 3, BODC: 1
S flags level 161	Coriolis: 3, BODC: 1
S flags level 162	Coriolis: 3, BODC: 1
S flags level 163	Coriolis: 3, BODC: 1
S flags level 164	Coriolis: 3, BODC: 1
S flags level 165	Coriolis: 3, BODC: 1
S flags level 166	Coriolis: 3, BODC: 1
S flags level 167	Coriolis: 3, BODC: 1
S flags level 168	Coriolis: 3, BODC: 1
S flags level 169	Coriolis: 3, BODC: 1
S flags level 170	Coriolis: 3, BODC: 1
S flags level 171	Coriolis: 3, BODC: 1
S flags level 172	Coriolis: 3, BODC: 1
S flags level 173	Coriolis: 3, BODC: 1
S flags level 174	Coriolis: 3, BODC: 1
S flags level 175	Coriolis: 3, BODC: 1
S flags level 176	Coriolis: 3, BODC: 1
S flags level 177	Coriolis: 3, BODC: 1
S flags level 178	Coriolis: 3, BODC: 1
S flags level 179	Coriolis: 3, BODC: 1
S flags level 180	Coriolis: 3, BODC: 1
S flags level 181	Coriolis: 3, BODC: 1
S flags level 182	Coriolis: 3, BODC: 1
S flags level 183	Coriolis: 3, BODC: 1
S flags level 184	Coriolis: 3, BODC: 1
S flags level 185	Coriolis: 3, BODC: 1
S flags level 186	Coriolis: 3, BODC: 1
S flags level 187	Coriolis: 3, BODC: 1
S flags level 188	Coriolis: 3, BODC: 1
S flags level 189	Coriolis: 3, BODC: 1
S flags level 190	Coriolis: 3, BODC: 1
S flags level 191	Coriolis: 3, BODC: 1
S flags level 192	Coriolis: 3, BODC: 1
S flags level 193	Coriolis: 3, BODC: 1
S flags level 194	Coriolis: 3, BODC: 1
S flags level 195	Coriolis: 3, BODC: 1
S flags level 196	Coriolis: 3, BODC: 1
S flags level 197	Coriolis: 3, BODC: 1
S flags level 198	Coriolis: 3, BODC: 1
S flags level 199	Coriolis: 3, BODC: 1
S flags level 200	Coriolis: 3, BODC: 1
S flags level 201	Coriolis: 3, BODC: 1
S flags level 202	Coriolis: 3, BODC: 1
S flags level 203	Coriolis: 3, BODC: 1
S flags level 204	Coriolis: 3, BODC: 1
S flags level 205	Coriolis: 3, BODC: 1
S flags level 206	Coriolis: 3, BODC: 1
S flags level 207	Coriolis: 3, BODC: 1
S flags level 208	Coriolis: 3, BODC: 1
S flags level 209	Coriolis: 3, BODC: 1
S flags level 210	Coriolis: 3, BODC: 1
S flags level 211	Coriolis: 3, BODC: 1
S flags level 212	Coriolis: 3, BODC: 1
S flags level 213	Coriolis: 3, BODC: 1
S flags level 214	Coriolis: 3, BODC: 1
S flags level 215	Coriolis: 3, BODC: 1
S flags level 216	Coriolis: 3, BODC: 1
S flags level 217	Coriolis: 3, BODC: 1
S flags level 218	Coriolis: 3, BODC: 1
S flags level 219	Coriolis: 3, BODC: 1
S flags level 220	Coriolis: 3, BODC: 1
S flags level 221	Coriolis: 3, BODC: 1
S flags level 222	Coriolis: 3, BODC: 1
S flags level 223	Coriolis: 3, BODC: 1
S flags level 224	Coriolis: 3, BODC: 1
S flags level 225	Coriolis: 3, BODC: 1
S flags level 226	Coriolis: 3, BODC: 1
S flags level 227	Coriolis: 3, BODC: 1
S flags level 228	Coriolis: 3, BODC: 1
S flags level 229	Coriolis: 3, BODC: 1
S flags level 230	Coriolis: 3, BODC: 1
S flags level 231	Coriolis: 3, BODC: 1
S flags level 232	Coriolis: 3, BODC: 1
S flags level 233	Coriolis: 3, BODC: 1
S flags level 234	Coriolis: 3, BODC: 1
S flags level 235	Coriolis: 3, BODC: 1
S flags level 236	Coriolis: 3, BODC: 1
S flags level 237	Coriolis: 3, BODC: 1
S flags level 238	Coriolis: 3, BODC: 1
S flags level 239	Coriolis: 3, BODC: 1
S flags level 240	Coriolis: 3, BODC: 1
S flags level 241	Coriolis: 3, BODC: 1
S flags level 242	Coriolis: 3, BODC: 1
S flags level 243	Coriolis: 3, BODC: 1
S flags level 244	Coriolis: 3, BODC: 1
S flags level 245	Coriolis: 3, BODC: 1
S flags level 246	Coriolis: 3, BODC: 1
S flags level 247	Coriolis: 3, BODC: 1
S flags level 248	Coriolis: 3, BODC: 1
S flags level 249	Coriolis: 3, BODC: 1
S flags level 250	Coriolis: 3, BODC: 1
S flags level 251	Coriolis: 3, BODC: 1
S flags level 252	Coriolis: 3, BODC: 1
S flags level 253	Coriolis: 3, BODC: 1
S flags level 254	Coriolis: 3, BODC: 1
S flags level 255	Coriolis: 3, BODC: 1
S flags level 256	Coriolis: 3, BODC: 1
S flags level 257	Coriolis: 3, BODC: 1
S flags level 258	Coriolis: 3, BODC: 1
S flags level 259	Coriolis: 3, BODC: 1
S flags level 260	Coriolis: 3, BODC: 1
S flags level 261	Coriolis: 3, BODC: 1
S flags level 262	Coriolis: 3, BODC: 1
S flags level 263	Coriolis: 3, BODC: 1
S flags level 264	Coriolis: 3, BODC: 1
S flags level 265	Coriolis: 3, BODC: 1
S flags level 266	Coriolis: 3, BODC: 1
S flags level 267	Coriolis: 3, BODC: 1
S flags level 268	Coriolis: 3, BODC: 1
S flags level 269	Coriolis: 3, BODC: 1
S flags level 270	Coriolis: 3, BODC: 1
S flags level 271	Coriolis: 3, BODC: 1
S flags level 272	Coriolis: 3, BODC: 1
S flags level 273	Coriolis: 3, BODC: 1
S flags level 274	Coriolis: 3, BODC: 1
S flags level 275	Coriolis: 3, BODC: 1
S flags level 276	Coriolis: 3, BODC: 1
S flags level 277	Coriolis: 3, BODC: 1
S flags level 278	Coriolis: 3, BODC: 1
S flags level 279	Coriolis: 3, BODC: 1
S flags level 280	Coriolis: 3, BODC: 1
S flags level 281	Coriolis: 3, BODC: 1
S flags level 282	Coriolis: 3, BODC: 1
S flags level 283	Coriolis: 3, BODC: 1
S flags level 284	Coriolis: 3, BODC: 1
S flags level 285	Coriolis: 3, BODC: 1
S flags level 286	Coriolis: 3, BODC: 1
S flags level 287	Coriolis: 3, BODC: 1
S flags level 288	Coriolis: 3, BODC: 1
S flags level 289	Coriolis: 3, BODC: 1

S flags level 290 Coriolis: 3, BODC: 1
S flags level 291 Coriolis: 3, BODC: 1
S flags level 292 Coriolis: 3, BODC: 1
S flags level 293 Coriolis: 3, BODC: 1
S flags level 294 Coriolis: 3, BODC: 1
S flags level 295 Coriolis: 3, BODC: 1
S flags level 296 Coriolis: 3, BODC: 1
S flags level 297 Coriolis: 3, BODC: 1
S flags level 298 Coriolis: 3, BODC: 1
S flags level 299 Coriolis: 3, BODC: 1
S flags level 300 Coriolis: 3, BODC: 1
S flags level 301 Coriolis: 3, BODC: 1
S flags level 302 Coriolis: 3, BODC: 1
S flags level 303 Coriolis: 3, BODC: 1
S flags level 304 Coriolis: 3, BODC: 1
S flags level 305 Coriolis: 3, BODC: 1
S flags level 306 Coriolis: 3, BODC: 1
S flags level 307 Coriolis: 3, BODC: 1
S flags level 308 Coriolis: 3, BODC: 1
S flags level 309 Coriolis: 3, BODC: 1
S flags level 310 Coriolis: 3, BODC: 1
S flags level 311 Coriolis: 3, BODC: 1
S flags level 312 Coriolis: 3, BODC: 1
S flags level 313 Coriolis: 3, BODC: 1
S flags level 314 Coriolis: 3, BODC: 1
S flags level 315 Coriolis: 3, BODC: 1
S flags level 316 Coriolis: 3, BODC: 1
S flags level 317 Coriolis: 3, BODC: 1
S flags level 318 Coriolis: 3, BODC: 1
S flags level 319 Coriolis: 3, BODC: 1
S flags level 320 Coriolis: 3, BODC: 1
S flags level 321 Coriolis: 3, BODC: 1
S flags level 322 Coriolis: 3, BODC: 1
S flags level 323 Coriolis: 3, BODC: 1
S flags level 324 Coriolis: 3, BODC: 1
S flags level 325 Coriolis: 3, BODC: 1
S flags level 326 Coriolis: 3, BODC: 1
S flags level 327 Coriolis: 3, BODC: 1
S flags level 328 Coriolis: 3, BODC: 1
S flags level 329 Coriolis: 3, BODC: 1
S flags level 330 Coriolis: 3, BODC: 1
S flags level 331 Coriolis: 3, BODC: 1
S flags level 332 Coriolis: 3, BODC: 1
S flags level 333 Coriolis: 3, BODC: 1
S flags level 334 Coriolis: 3, BODC: 1
S flags level 335 Coriolis: 3, BODC: 1
S flags level 336 Coriolis: 3, BODC: 1
S flags level 337 Coriolis: 3, BODC: 1
S flags level 338 Coriolis: 3, BODC: 1
S flags level 339 Coriolis: 3, BODC: 1
S flags level 340 Coriolis: 3, BODC: 1
S flags level 341 Coriolis: 3, BODC: 1
S flags level 342 Coriolis: 3, BODC: 1
S flags level 343 Coriolis: 3, BODC: 1
S flags level 344 Coriolis: 3, BODC: 1
S flags level 345 Coriolis: 3, BODC: 1
S flags level 346 Coriolis: 3, BODC: 1
S flags level 347 Coriolis: 3, BODC: 1
S flags level 348 Coriolis: 3, BODC: 1
S flags level 349 Coriolis: 3, BODC: 1
S flags level 350 Coriolis: 3, BODC: 1
S flags level 351 Coriolis: 3, BODC: 1
S flags level 352 Coriolis: 3, BODC: 1
S flags level 353 Coriolis: 3, BODC: 1
S flags level 354 Coriolis: 3, BODC: 1
S flags level 355 Coriolis: 3, BODC: 1
S flags level 356 Coriolis: 3, BODC: 1
S flags level 357 Coriolis: 3, BODC: 1
S flags level 358 Coriolis: 3, BODC: 1
S flags level 359 Coriolis: 3, BODC: 1
S flags level 360 Coriolis: 3, BODC: 1
S flags level 361 Coriolis: 3, BODC: 1
S flags level 362 Coriolis: 3, BODC: 1
S flags level 363 Coriolis: 3, BODC: 1
S flags level 364 Coriolis: 3, BODC: 1
S flags level 365 Coriolis: 3, BODC: 1
S flags level 366 Coriolis: 3, BODC: 1
S flags level 367 Coriolis: 3, BODC: 1
S flags level 368 Coriolis: 3, BODC: 1
S flags level 369 Coriolis: 3, BODC: 1
S flags level 370 Coriolis: 3, BODC: 1
S flags level 371 Coriolis: 3, BODC: 1
S flags level 372 Coriolis: 3, BODC: 1
S flags level 373 Coriolis: 3, BODC: 1
S flags level 374 Coriolis: 3, BODC: 1
S flags level 375 Coriolis: 3, BODC: 1
S flags level 376 Coriolis: 3, BODC: 1
S flags level 377 Coriolis: 3, BODC: 1
S flags level 378 Coriolis: 3, BODC: 1
S flags level 379 Coriolis: 3, BODC: 1
S flags level 380 Coriolis: 3, BODC: 1
S flags level 381 Coriolis: 3, BODC: 1
S flags level 382 Coriolis: 3, BODC: 1
S flags level 383 Coriolis: 3, BODC: 1
S flags level 384 Coriolis: 3, BODC: 1
S flags level 385 Coriolis: 3, BODC: 1
S flags level 386 Coriolis: 3, BODC: 1
S flags level 387 Coriolis: 3, BODC: 1
S flags level 388 Coriolis: 3, BODC: 1
S flags level 389 Coriolis: 3, BODC: 1
S flags level 390 Coriolis: 3, BODC: 1
S flags level 391 Coriolis: 3, BODC: 1
S flags level 392 Coriolis: 3, BODC: 1
S flags level 393 Coriolis: 3, BODC: 1
S flags level 394 Coriolis: 3, BODC: 1
S flags level 395 Coriolis: 3, BODC: 1
S flags level 396 Coriolis: 3, BODC: 1
S flags level 397 Coriolis: 3, BODC: 1
S flags level 398 Coriolis: 3, BODC: 1
S flags level 399 Coriolis: 3, BODC: 1
S flags level 400 Coriolis: 3, BODC: 1
S flags level 401 Coriolis: 3, BODC: 1
S flags level 402 Coriolis: 3, BODC: 1
S flags level 403 Coriolis: 3, BODC: 1
S flags level 404 Coriolis: 3, BODC: 1
S flags level 405 Coriolis: 3, BODC: 1
S flags level 406 Coriolis: 3, BODC: 1
S flags level 407 Coriolis: 3, BODC: 1
S flags level 408 Coriolis: 3, BODC: 1
S flags level 409 Coriolis: 3, BODC: 1

Frozen profile not detected. Tolerance values slightly different from those in QC manual.

**************** Good Profiles **

5900912 #14
2900410 #4 D
4900528 #91
6900367 #84
2900398 #186
1900122 #49
5900031 #20

No flags on good profiles.

Output display :

```
1900044
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
04102(1) : impossible global temperatures for indexes: 12
associated values                        : 42.636
04102(1) : impossible global salinity for indexes:       1       12
associated values                     :   57.67   3.30
04102(1) : failed century bottom depth test for indexes: 1
associated values                 : 4916
 (lat,lon) = depth                : (-49.502,134.483) = 3422
04102(1) : failed max depth test for indexes: 1
associated values               : 4916
max depth                     : 2000
Finished QC phase 2
************************************************************************
1900074
Starting QC phase 1
05494(205999) : float travelled 3170.9074 km in 10 days, max distance at 3m/s is 2592 km
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
************************************************************************
1900122
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
************************************************************************
1900144
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
21748(1) : failed century bottom depth test for indexes: 20
associated values                 : 5224.4
 (lat,lon) = depth                : (-7.025,87.799) = 5021
21748(1) : failed max depth test for indexes: 20
associated values               : 5224.4
max depth                     : 2000
Finished QC phase 2
************************************************************************
1900380
************************************************************************
1900521
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
56448(1) : impossible global temperatures for indexes: 1
associated values                        : 42.183
56448(1) : impossible global salinity for indexes:       1       2       3       4       39
associated values                     :   58.16   3.16  50.44  15.11  17.68
 (lat,lon) = depth                : (0.137,-19.242) = 3186
56448(1) : failed max depth test for indexes: 1  2  3  4
associated values               : 6221.5        5161.6        3391.4        3039.4
max depth                     : 2000
Finished QC phase 2
************************************************************************
1900541
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
54041(2) : failed density inversion test for indexes: 121  122  123
associated density values             : 1023.5508      1023.5821      1023.6646
associated pressure values             : 13   7   2
```

```
associated temperature values         : 24.3      24.296      24.287
associated salinity values          : 34.924      34.998      35.132
Finished QC phase 2
**********************************************************************
2900398
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
2900410
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
3900259
Starting QC phase 1
46427(206011) : abs(lat=999.999) > 90
46427(206011) : abs(lon=639.999) > 180
Finished QC phase 1
Starting QC phase 2
46427(1) : abs(lat=999.999) > 90
46427(1) : abs(lon=639.999) > 180
46427(1) : impossible global temperatures for indexes: 68
associated values                        : 54.761
46427(1) : impossible global salinity for indexes:      54      66      67      68
associated values                   :   0.00  64.59   6.26  14.19
46427(1) : failed increasing pressure test for indexes: 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19
20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51
52  53  54  55  56  57  58  59  61  62  63  64  65  66
corresponding values                : 1948.6      1898.9      1849.3      1799.3      1749      1699.3      1649.1
1599.1      1549.5      0      9999      9999      9999      9999      9999      1198.9      1149.4
1099.6      1049.2      999.1      949.3      899.3      849.4      799.5      749      698.8      648.9
599.2      549.1      498.9      449.2      399.3      379.5      359.3      349.4      339.3      329.6
319.3      308.9      299      288.8      279.3      269.3      258.9      249.3      239.2      226.2
219.2      209      199.4      189.5      3455.9      169.4      0      9999      9999      9999
9999      9999      88.9      79      69.1      878.9      49.5      4899.6
Finished QC phase 2
**********************************************************************
4900103
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
29407(1) : impossible global temperatures for indexes: 9  30  34
associated values                        : -2.748      43.093      61.342
29407(1) : impossible global salinity for indexes:      7      9      16      24      30      31      34      55      68
associated values                   :   48.90  43.11  22.24  62.91   1.71  52.22  62.98  17.77  43.53
29407(1) : failed temp. spike test for indexes: 55  68  14  15  16  24  31  36
associated values                 : 33.448      22.202      10.481      2.289      4.927      28.062      25.21      7.82
29407(1) : failed salinity spike test for indexes: 14  36
associated values                   : 33.988      36.862
29407(1) : failed density inversion test for indexes: 6  49  50  56  67
associated density values           : 1036.1511      1028.4817      1029.0742      1027.8718      1026.7787
associated pressure values          : 1849.4      339.4      330.3      239.5      139.6
associated temperature values         : 2.033      4.246      2.758      4.7      4.728
associated salinity values          : 34.553      33.926      34.528      33.805      33.013
Finished QC phase 2
**********************************************************************
4900272
Starting QC phase 1
00034(206023) : abs(lat=99.999) > 90
Finished QC phase 1
Starting QC phase 2
00034(2) : abs(lat=99.999) > 90
Finished QC phase 2
```

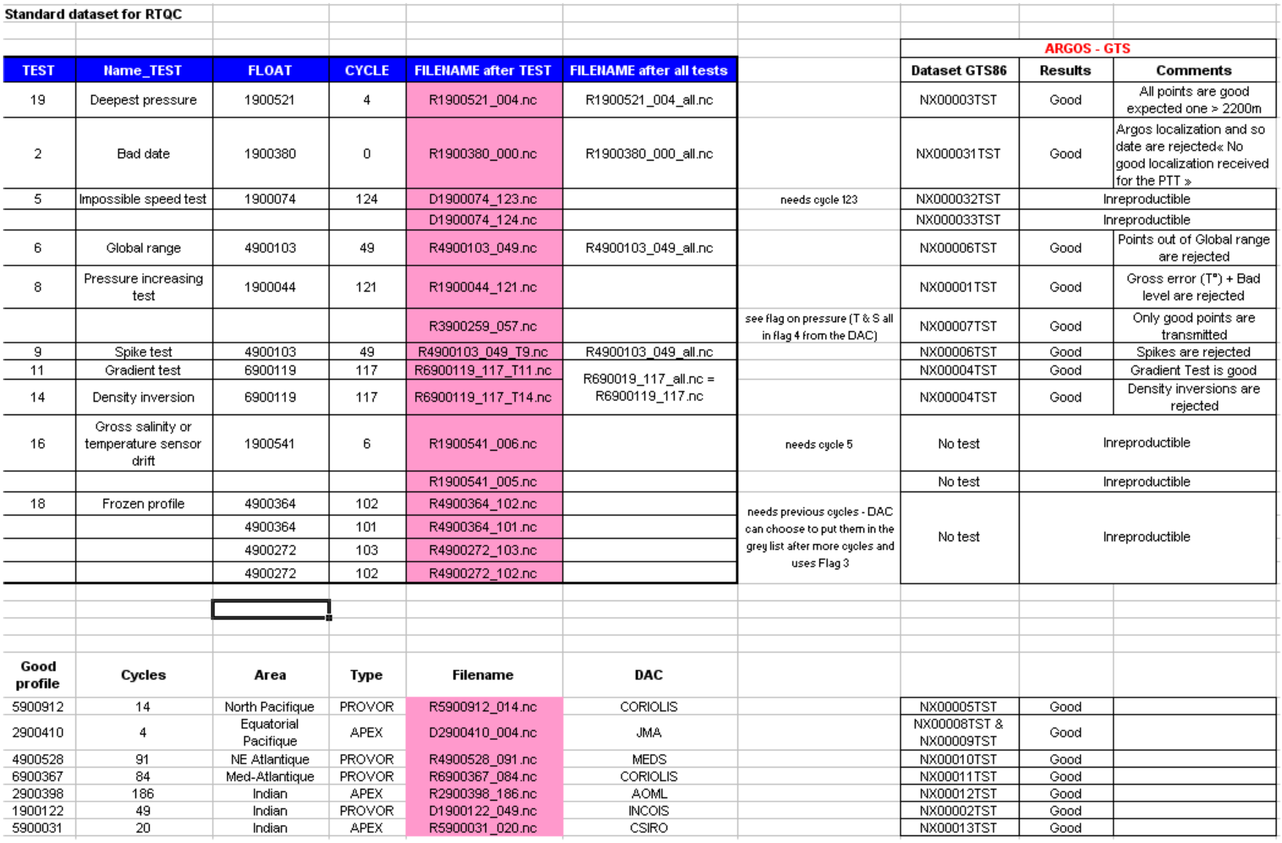
```
**********************************************************************
4900364
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
07445(2) : failed density inversion test for indexes: 28  29
associated density values            : 1026.1208     1026.1521
associated pressure values            : 135  125
associated temperature values          : 21.522      21.301
associated salinity values            : 36.557      36.574
Finished QC phase 2
**********************************************************************
4900528
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
5900031
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
5900912
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
6900119
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
56050(1) : impossible global temperatures for indexes: 31
associated values                        : 47.489
56050(1) : impossible global salinity for indexes:       27
associated values                       :   47.01
56050(1) : failed max depth test for indexes: 1
associated values                : 2637.9
max depth                       : 2000
56050(1) : failed temp. spike test for indexes: 21
associated values                     : 30.144
56050(1) : failed salinity spike test for indexes: 51  22
associated values                       : 34.516      34.657
56050(1) : failed density inversion test for indexes: 45  46
associated density values            : 1029.9377     1030.1545
associated pressure values            : 239.3       230.1
associated temperature values          : 15.903      13.725
associated salinity values            : 39.047      38.735
56050(1) : salinity envelop test dpth 1100:3000 , allowed range 22:38
failed salinity envelop test for indexes: 2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19
associated salinity values           : 38.777      38.773      38.769      38.764      38.76       38.756      38.751
38.748      38.744      38.74       38.737      38.733      38.731      38.728      38.727      38.727      38.727      38.729
Finished QC phase 2
**********************************************************************
6900367
Starting QC phase 1
Finished QC phase 1
Starting QC phase 2
Finished QC phase 2
**********************************************************************
```

1.3. CLS

Results of the QC Argo done on the operational GTS chain. (Yann Bernard e-mail ybernard@cls.fr)

The actual QC tested on GTS86 are in good conformity with the Argo User's Manual. Several tests have not been done because of the missing QC or the limitation of the simulation tool.

An overview of all the Argo quality control at CLS has been also realized, it indicates the operational of the actual GTS86 chain. However 4 developments are to be done in the technical qualification of the future A2001 chain, in order that the GTS treatment of the Argo CLS data is totally in agreement with the quality control requested by the Argo community.



Standard dataset for RTQC

							ARGOS - GTS		
TEST	**Name_TEST**	**FLOAT**	**CYCLE**	**FILENAME after TEST**	**FILENAME after all tests**		**Dataset GTS86**	**Results**	**Comments**
19	Deepest pressure	1900521	4	R1900521_004.nc	R1900521_004_all.nc		NX00003TST	Good	All points are good expected one > 2200m
2	Bad date	1900380	0	R1900380_000.nc	R1900380_000_all.nc		NX000031TST	Good	Argos localization and so date are rejected« No good localization received for the PTT »
5	Impossible speed test	1900074	124	D1900074_123.nc		needs cycle 123	NX000032TST	Inreproductible	
				D1900074_124.nc			NX000033TST	Inreproductible	
6	Global range	4900103	49	R4900103_049.nc	R4900103_049_all.nc		NX00006TST	Good	Points out of Global range are rejected
8	Pressure increasing test	1900044	121	R1900044_121.nc			NX00001TST	Good	Gross error (T°) + Bad level are rejected
				R3900259_057.nc		see flag on pressure (T & S all in flag 4 from the DAC)	NX00007TST	Good	Only good points are transmitted
9	Spike test	4900103	49	R4900103_049_T9.nc	R4900103_049_all.nc		NX00006TST	Good	Spikes are rejected
11	Gradient test	6900119	117	R6900119_117_T11.nc	R690019_117_all.nc = R6900119_117.nc		NX00004TST	Good	Gradient Test is good
14	Density inversion	6900119	117	R6900119_117_T14.nc			NX00004TST	Good	Density inversions are rejected
16	Gross salinity or temperature sensor drift	1900541	6	R1900541_006.nc		needs cycle 5	No test	Inreproductible	
				R1900541_005.nc			No test	Inreproductible	
18	Frozen profile	4900364	102	R4900364_102.nc		needs previous cycles - DAC can choose to put them in the grey list after more cycles and uses Flag 3	No test	Inreproductible	
		4900364	101	R4900364_101.nc					
		4900272	103	R4900272_103.nc					
		4900272	102	R4900272_102.nc					

Good profile	**Cycles**	**Area**	**Type**	**Filename**	**DAC**				
5900912	14	North Pacifique	PROVOR	R5900912_014.nc	CORIOLIS		NX00005TST	Good	
2900410	4	Equatorial Pacifique	APEX	D2900410_004.nc	JMA		NX00008TST & NX00009TST	Good	
4900528	91	NE Atlantique	PROVOR	R4900528_091.nc	MEDS		NX00010TST	Good	
6900367	84	Med-Atlantique	PROVOR	R6900367_084.nc	CORIOLIS		NX00011TST	Good	
2900398	186	Indian	APEX	R2900398_186.nc	AOML		NX00012TST	Good	
1900122	49	Indian	PROVOR	D1900122_049.nc	INCOIS		NX00002TST	Good	
5900031	20	Indian	APEX	R5900031_020.nc	CSIRO		NX00013TST	Good	

Results :

The following table shows the test's results of the Argo QC applied to bad profiles (typical error cases). The mention « OK » means that the results obtained by GTS86 are the same as those sent by Coriolis. The result « non reproducible » means that the test is not at this time realized by the used simulation tool.

QC Argo	QC definition	Results	Comments
Deepest pressure	Check profile pressure which do not exceed max value allowed +10%	OK	This control is done at CLS by the QC « User limits » with the max value +10% to not exceed
Bad date	Check valid observation date format	OK	The date is linked to the Argos localization, a bad date is rejected by the following error message : « No good localization received for the PTT »
Impossible speed test	Check float speed between 2 consecutive observations <3 m/s	OK	A field « max speed » in the BUT GTS declaration allows to do this control.

Global range	Check if T and S data are between Argo global scales	OK	This control is done at CLS par by the QC « User limits », declaring min and max values for T and S
Pressure increasing test	Check decreasing pressure to flag inversion or duplicated levels	OK	The GTS chain sorts pressures by increasing order but does not remove the duplicates, but the test profiles had level inversions but did not contain duplicated levels.
Spike test	Check the lack of differences (from T or S) between 3 sequential measurements compared to the limits given by Argo	OK	Control done by the QC n°10 « Spike » of the GTS chain.
Gradient test	Check the presence of a correct gradient between d'un gradient correct between 3 sequential measurements (from T or S) compared to the gradients given by Argo	OK	Control done by the QC n°11 « Spike » of the GTS chain.
Density inversion	Check the density inversions with a range of inversion accepted by Argo	OK	Control done by the QC n°11 « Spike » of the GTS chain but the density inversions are only controlled by one side : Down-> Up
Gross salinity or temperature sensor drift	Calculate the salinity and temperature average of the 100 last dB (~100 meters) of a profile and to compare with those of the last good profile of the same float.	Not reproduced	This QC does not exist at this time in the actual GTS chain of CLS.
Frozen profile	Check that a float does not transmit each time the same profile (with very small variations)	Not reproduced	This QC does not exist at this time in the actual GTS chain of CLS.

The following table shows results of the Argo QC tests on the good profiles (constituted only with correct measurements) coming from floats located in different oceans. All those profiles have been correctly tested by CLS.

Geographical area	Float models	Results	Number of points validated by GTS86	Number of correct expected points
North Pacific	PROVOR	OK	100	100
Equatorial Pacific	APEX	OK	115	115
NE Atlantic	PROVOR	OK	71	71
Med-Atlantic	PROVOR	OK	72	72
Indian	APEX	OK	34	34
Indian	PROVOR	OK	45	45
Indian	APEX	OK	54	54

<u>Overview :</u>

After working on ARGO tests, an overview on the ARGO real time quality control has been done at CLS taking into account the last Argo reference manual (11/2006) : Argo quality control manual v2.2. The following table shows all the Argo real time QC to process by a DAC, and the QC report at CLS on the GTS operational chain and actions to do on A2001 during its operational qualification.

QC Argo	Description	QC report at CLS	Action on A2001
Platform identification	Check valid n° WMO	OK : declaration BUT GTS	-
Impossible date test	Check that the observation date is valid	OK : Argos collect date	-
Impossible location test	Check that the latitude is between -90° and 90° ; the longitude between -180° et 180°	OK : Argos localization	-
Position on land test	Check that localization and observation is in an ocean	Missing	To implement
Impossible speed test	Check float speed between 2 consecutive observations : <3 m/s	OK : declaration BUT GTS	-
Global range test	Check that T and S data are in the global scales.	OK : QC « User limits »	-
Regional range test	Check that T and S observations in Red Sea and Med. are in the appropriate range of values	OK : QC « Climatological test »	-
Pressure increasing test	Check that profile pressures decrease to flag inversions or constant pressures (duplicates)	OK : The pressure are sorted by increasing order and the « DEPTH_PRESS » model use can round off to (use to eliminate duplicates)	-
Spike test	Check differences between 3 sequential measurements (T or S) compared to given gradients	OK : QC « Spike test »	-
Gradient test	Check existence of correct gradient between 3 sequential measurements (T or S) compared to given gradients	OK : QC « Gradient test »	-
Digit rollover test	Check if measure scale (for T and S) is appropriated : no rollover	OK : declaration BUT GTS	-
Stuck value test	Check that data (T and S) are not all identical in the profile	OK : QC « Stuck value test »	-
Density inversion	Check density inversion with an acceptable inversion range	OK : QC « Density inversion » control inversion only in one way	To implement
Grey list	Check that the n° WMO is not in the grey list (doubtful or bad floats)	OK : manual procedure by YB or BUT	-
Gross salinity or temperature sensor drift	Calculate temperature and salinity average for the last 100 dB of a profile and compare them with average of the last good profile of the same float	Missing	To implement
Frozen profile test	Check that a float does not transmit again and again the same profile (with very light variations)	Missing	To implement
Deepest pressure test	Check that pressures of a profile do not exceed the max accepted value +10%	OK : QC « User limits »	-

Results and Perspectives :

The QC Argo real time test results of the GTS86 chain are positive for the existing QC :

- no incorrect measure is transmitted.

- if in a triplet (T,S,P) a single measure is wrong (T or S), the triplet is transmitted, the wrong measure being changed in TESAC by ////.

Nevertheless the existing QC are a little bit more restrictive than those of Coriolis :

- some additional right inversion density are observed,
- some good measurements close to the wrong measurements are also considered as wrong.

Those tests allowed to point out the quality control in CLS and then to identify some missing controls. To be perfectly in agreement with the last « Argo QC manual », the missing QC (mention « To implement » in the previous table) are going to be implemented in the future chain of treatment GTS : A2001 phase 3B. The addition of new QC is planned to be done during the technical qualification phase, at this time in progress (Action Yann Bernard + Technical Direction of CLS).

This test will be reproduced on the Argos 2001 chain in order to validate all the Argo QC, new and old, before starting the production of the Argos 2001 phase 3B during the second semester 2007 (Action : Yann Bernard).

1.4. CSIO

Operator: Liu Zenghong e-amil davids_liu@263.net

1. Float 1900074 (cycle_number = 124)

The maximum speed check flag is '4', then the overall flags for temperature and salinity measurements are assigned to '4'. (see file 0001_05494_124.qc)
Note that I downloaded its trajectory file to read Argos satellite positions for this cycle. Some technical messages in this file may not be correct, I just want to fill these fields and make the file has the right format into our system, the QCed files below are the same.

Example of file format provided by CSIO => file 0001_05494_124.qc:

```
INTERNAL ID NUMBER                     0001
WMO ID NUMBER                       1900074
TRANSMISSION ID NUMBER                    05494
PROFILE NUMBER                        124
WMO INSTRUMENT TYPE (TABLE 1770)        846
WMO RECORDER TYPE (TABLE 4770)        60
ARGOS PROGRAM NUMBER                  02412
INSTRUMENT TYPE                     APEX_TS8
CONTROLLER SN                       1114
PI                        Yves DESAUBIES
JULD_QC                          1
START OF TRANSMISSION                 2005 08 11 09 07 05
PROFILE LENGTH (BINS)                 60
BATTERY (VOLT)                     14.15
BATTERY CURRENT (COUNTS)                54
AIR BLADDER PRESSURE                  148
AIR PUMP ON TIME (SECONDS)              1144
BATTERY CURRENT AIR PUMP ON (COUNTS)     23
DRIFT BATTERY (VOLT)                  15.54
DRIFT TEMPERATURE (DEG C)               4.454
DRIFT PRESSURE (DBAR)                 1500.0
DRIFT SALINITY (PSU)                34.550
SURFACE PRESSURE (DBAR)                 5.0
INTERNAL VACUUM (INCHES HG)              -6.5
PISTON POSITION                     228
PROFILE PISTON POSITION                 18
SURFACE PISTON POSITION                 250
DRIFT PISTON POSITION                 72
FORMAT NUMBER (COUNTS)                  4
DEPTH TABLE NUMBER (COUNTS)               65
SURFACE BATTERY VOLTAGE (VOLT)            15.74
BATTERY CURRENT SBE PUMP ON (COUNTS)     15
PROFILE TERMINATION FLAG (HEX)          9
NUMBER OF COLUMNS                      17
1. COLUMN                       PRESSURE (DBAR)
```

```
2. COLUMN                  TEMPERATURE-90 (DEG C)
3. COLUMN                  SALINITY (PSU)
4. COLUMN                  CHECKSUM FLAG
5. COLUMN                  PRESSURE INCREASING CHECK_P FLAG
6. COLUMN                  DEEPEST PRESSURE CHECK FLAG
7. COLUMN                  GROSS CHECK_T FLAG
8. COLUMN                  VERTICAL GRADIENT CHECK_T FLAG
9. COLUMN                  CLIMATOLOGY CHECK_T FLAG
10. COLUMN                 ANALYSIS CHECK_T FLAG
11. COLUMN                 SPIKE CHECK_T FLAG
12. COLUMN                 GROSS CHECK_S FLAG
13. COLUMN                 DENSITY GRADIENT CHECK_S FLAG
14. COLUMN                 CLIMATOLOGY CHECK_S FLAG
15. COLUMN                 ANALYSIS CHECK_S FLAG
16. COLUMN                 SPIKE CHECK_S FLAG
17. COLUMN                 VERTICAL GRADIENT CHECK_S FLAG
CALIB EQ 1 FOR SALINITY          SSLOPE*CNTS+SOFF
CALIB COEF FOR SALINITY           SSLOPE=0.001; SOFF=0.0;
CALIB EQ 1 FOR TEMPERATURE           TSLOPE*CNTS+TOFF
CALIB COEF FOR TEMPERATURE            TSLOPE=0.001; TOFF=0.0;
CALIB EQ 1 FOR PRESSURE           PSLOPE*CNTS+POFF
CALIB COEF FOR PRESSURE            PSLOPE=0.1; POFF=0.0;
CALIB EQ 1 FOR VOLTAGE           VSLOPE*CNTS+VOFF
CALIB COEF FOR VOLTAGE            VSLOPE=0.0989; VOFF=0.4077;
CALIB EQ 1 FOR VACUUM            VACSLOPE*CNTS+VACOFF
CALIB COEF FOR VACUUM             VACSLOPE=0.2359; VACOFF=-29.8987;
OVERALL FLAG FOR T             4
MAXIMUM ANALYSIS CHECK_T FLAG        0
MAXIMUM CLIMATOLOGY_T FLAG          0
MAXIMUM GROSS CHECK_T FLAG          1
MAXIMUM VERTICAL GRADIENT_T FLAG       1
MAXIMUM SPIKE CHECK_T FLAG          1
MAXIMUM CONSTANT VALUE CHECK_T FLAG     1
MAXIMUM JUMP CHECK_T FLAG           0
FROZEN PROFILE INDICATOR FOR T        0
GREY LIST FLAG FOR T              1
MAXIMUM DEEPEST PRESSURE CHECK FLAG     0
MAXIMUM SPEED CHECK FLAG           4
MAXIMUM PRESSURE INCREASING FLAG       1
SIGMA USED FOR CLIMATOLOGY          10.00
SIGMA USED FOR ANALYSIS            10.00
CLIMATOLOGY VERSION USED           LEVITUS WOA-2001
ANALYSIS TIME USED             2004-04-04 (38079.958333333)
ANALYSIS VERSION USED            v 5.3 1999/12/03 16:59:31 vb Exp
OVERALL FLAG FOR S             4
MAXIMUM ANALYSIS CHECK_S FLAG        0
MAXIMUM CLIMATOLOGY_S FLAG          0
MAXIMUM GROSS CHECK_S FLAG          1
MAXIMUM DENSITY GRADIENT_S FLAG       1
MAXIMUM SPIKE CHECK_S FLAG          1
MAXIMUM CONSTANT VALUE CHECK_S FLAG     1
MAXIMUM JUMP CHECK_S FLAG           0
MAXIMUM SALINITY GRADIENT FLAG        0
FROZEN PROFILE INDICATOR FOR S        0
GREY LIST FLAG FOR S              1
============================================================
  LATITUDE  LONGITUDE YEAR/MO/DY HR:MN:SC XMITS SAT CLASS
   +99.999  +999.999 2005/08/11 09:07:00  000  N   0
   +38.022   -73.445 2005/08/11 09:30:00  010  N   1
   +31.297   -39.833 2005/08/11 10:41:00  010  L   2
   +31.297   -39.839 2005/08/11 10:58:00  010  L   3
   +31.306   -39.834 2005/08/11 11:42:00  010  L   1
   +31.309   -39.832 2005/08/11 12:37:00  010  L   2
   +31.315   -39.836 2005/08/11 13:23:00  010  L   1
   +31.365   -39.854 2005/08/11 14:22:00  010  L   B
   +31.319   -39.822 2005/08/11 15:02:00  010  L   2
   +31.356   -39.869 2005/08/11 15:07:00  010  L   B
   +31.313   -39.823 2005/08/11 16:02:00  010  L   2
   +31.312   -39.820 2005/08/11 16:47:00  010  L   2
   +31.302   -39.828 2005/08/11 17:42:00  010  L   2
   +31.298   -39.830 2005/08/11 18:29:00  010  L   2
   +31.299   -39.829 2005/08/11 18:37:00  010  L   1
   +99.999  +999.999 2005/08/11 18:45:00  000  N   0
============================================================
```

```
1948.8   4.235  35.080  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1899.2   4.363  35.090  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1849.4   4.526  35.107  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1799.2   4.691  35.123  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1749.0   4.926  35.158  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1699.4   5.085  35.175  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1649.4   5.149  35.181  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1599.1   5.319  35.198  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1549.1   5.555  35.225  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1499.3   5.775  35.248  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1449.6   6.021  35.276  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1399.5   6.407  35.322  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1349.4   6.758  35.353  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1299.3   6.895  35.348  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1249.4   7.195  35.368  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1199.4   7.466  35.366  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1149.2   7.656  35.367  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1099.3   7.850  35.355  1 1 0 1 1 0 0 1 1 1 0 0 1 0
1049.5   8.166  35.369  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 999.3  8.633  35.389  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 949.3  9.104  35.401  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 899.1  9.637  35.416  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 848.8  10.137  35.445  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 799.2  10.792  35.506  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 749.2  11.327  35.557  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 699.4  11.838  35.599  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 674.3  12.276  35.649  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 649.5  12.692  35.697  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 624.2  12.915  35.731  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 599.2  13.216  35.774  1 1 0 1 1 0 0 1 1 1 0 0 1 0
```

```
574.0  13.573  35.825  1 1 0 1 1 0 0 1 1 1 0 0 1 0
549.4  14.032  35.895  1 1 0 1 1 0 0 1 1 1 0 0 1 0
524.2  14.418  35.955  1 1 0 1 1 0 0 1 1 1 0 0 1 0
499.3  14.738  36.002  1 1 0 1 1 0 0 1 1 1 0 0 1 0
474.4  15.210  36.075  1 1 0 1 1 0 0 1 1 1 0 0 1 0
449.3  15.566  36.137  1 1 0 1 1 0 0 1 1 1 0 0 1 0
424.2  15.964  36.202  1 1 0 1 1 0 0 1 1 1 0 0 1 0
399.4  16.236  36.247  1 1 0 1 1 0 0 1 1 1 0 0 1 0
374.0  16.482  36.285  1 1 0 1 1 0 0 1 1 1 0 0 1 0
349.4  16.915  36.353  1 1 0 1 1 0 0 1 1 1 0 0 1 0
324.5  17.245  36.407  1 1 0 1 1 0 0 1 1 1 0 0 1 0
299.5  17.549  36.455  1 1 0 1 1 0 0 1 1 1 0 0 1 0
274.2  17.803  36.491  1 1 0 1 1 0 0 1 1 1 0 0 1 0
249.3  17.981  36.506  1 1 0 1 1 0 0 1 1 1 0 0 1 0
224.4  18.170  36.515  1 1 0 1 1 0 0 1 1 1 0 0 1 0
199.1  18.241  36.506  1 1 0 1 1 0 0 1 1 1 0 0 1 0
179.0  18.425  36.529  1 1 0 1 1 0 0 1 1 1 0 0 1 0
159.3  18.669  36.573  1 1 0 1 1 0 0 1 1 1 0 0 1 0
139.3  18.857  36.607  1 1 0 1 1 0 0 1 1 1 0 0 1 0
119.4  18.986  36.627  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 99.5  19.133  36.640  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 79.4  19.731  36.673  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 69.4  20.411  36.701  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 58.8  21.307  36.719  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 49.3  21.918  36.719  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 39.5  22.799  36.725  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 29.7  23.785  36.723  1 1 0 1 1 0 0 1 1 1 0 0 1 0
 19.8  25.646  36.714  1 1 0 1 1 0 0 1 1 1 0 0 1 0
  9.5  26.423  36.802  1 1 0 1 1 0 0 1 1 1 0 0 1 0
  7.5     26.427     36.803     1  1  0  1  1  0  0  1  1  1  0  0  1  0
```

2. Float 1900521 (cycle_number = 004)

The last 4 pressure measurements failed the deepest pressure test, some temperature and salinity measurements failed the gross check (global range test), spike check, density inverse check and gradient check, the overall flags for temperature and salinity were assigned to ‘4’ by our system. (see file 0002_56448_004.qc)

3. Float 1900380 (cycle_number = 000)

The JULD_QC = ‘4’, and the P&T&S failed the deepest pressure test, gross check, gradient check, spike check. The overall flags for T & S were assigned to ‘4’. (see file 0003_26724_000.qc)

4. Float 4900103 (cycle_number = 049)

The T&S of this cycle failed the gross check (global range test). Some T&S measurements failed the spike test (Column 11 & 16). (see file 0004_29407_049.qc)

5. Float 1900144 (cycle_number = 066)

The Pressure measurements failed the deepest pressure test and pressure increasing test. (see file 0011_21748_066.qc)

6. Float 3900259 (cycle_number = 057)

The pressure measurements failed the pressure increasing test and deepest pressure test. T&S failed the gross check, spike check and gradient check. The profile has no position report, ‘NO POSITION INDICATOR =1’, the overall flags for T&S were assigned to ‘4’. (see file 0006_46427_057.qc)

7. Float 6900119 (cycle_number = 117)

The pressure failed the deepest pressure test. T&S failed the regional range test (MEDITERRAREAN SEA), gross test, gradient test, density gradient test and spike test. (sea file 0007_56050_117.qc)

8. Float 1900541 (cycle_number = 006)

The salinity measurements failed the gross salinity or temperature sensor drift test comparing with the previous cycle (MAXIMUM JUMP CHECK_S FLAG = 4). (see file 0008_54041_006.qc)

9. Float 4900364 (cycle_number = 101, 102)

Frozen T&S profiles were detected for cycle=102. FROZEN PROFILE INDICATOR FOR T =1, FROZEN PROFILE INDICATOR FOR S =1. (see file 0009_07445_102.qc)

10. Float 4900272 (cycle_number = 102, 103)

Both of the profiles have no position report, so 'NO POSITION INDICATOR =1'. Frozen T&S profiles were detected for cycle=103. (see file 0010_99999_103.qc)

11. Float 5900912 (cycle_number = 014)

The profile passed through all the RTQC test without flag. Note that some Climatology and Analysis check flags = '4', which are the result from profile check comparing with WOA01 & NCEP reanalysis. These flags will not determine the profiles' QC flags. (see file 0012_54027_014.qc)

12. Float 2900410 (cycle_number = 004)

The profile passed through all the RTQC test without flag. (see file 0013_28392_004.qc)

13. Float 4900528 (cycle_number = 091)

The profile passed through all the RTQC test without flag. (see file 0014_48895_091.qc)

14. Float 6900367 (cycle_number = 084)

The profile passed through all the RTQC test without flag. (see file 0015_56200_084.qc)

15. Float 2900398 (cycle_number = 186)

The profile passed through all the RTQC test without flag. (see file 0016_28627_186.qc)

16. Float 1900122 (cycle_number = 049)

The profile passed through all the RTQC test without flag. (see file 0017_30030_049.qc)

17. Float 5900031 (cycle_number = 020)

The profile passed through all the RTQC test without flag. (see file 0018_06314_020.qc)

NOTE: Our RTQC codes were mainly provided by AOML.

1.5. CSIRO

Operator : Ann.thresher e-mail Ann.thresher@csiro.au

Data set : <<ADMT7_qc_tests.tar.gz>>

`tested_D1900074_124.nc`

`tested_D1900122_049.nc`

`tested_D2900410_004.nc`

`tested_R1900044_121.nc`

`tested_R1900144_066.nc`

`tested_R1900380_000.nc`

`tested_R1900521_004.nc`

`tested_R1900541_005.nc`

`tested_R1900541_006.nc`

`tested_R2900398_186.nc`

`tested_R3900259_057.nc`

`tested_R4900103_049.nc`

`tested_R4900272_102.nc`

`tested_R4900272_103.nc`

`tested_R4900364_101.nc`

`tested_R4900364_102.nc`

`tested_R4900528_091.nc`

`tested_R5900031_020.nc`

`tested_R5900912_014.nc`

`tested_R6900119_117.nc`

`tested_R6900367_084.nc`

Comments from Ann :

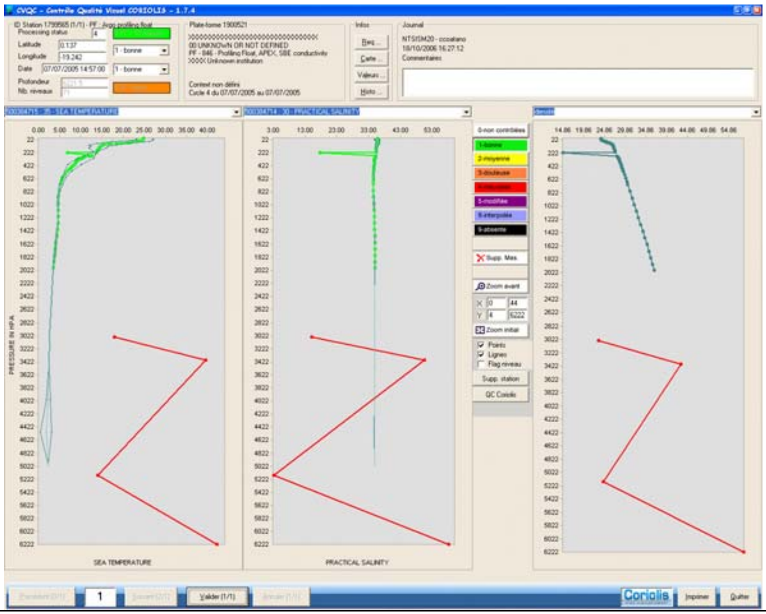
" I have gotten the QC tests run and the data is attached - it was difficult because we don't run from this sort of format and so putting the data together needed new programs. Hopefully all has run well and I've checked things but one test didn't work - because we run test 19 first and only use good data for the other tests, the pressure increasing test on R1900144_066 didn't fail (because the pressure had been replaced when it was found to be too deep)...

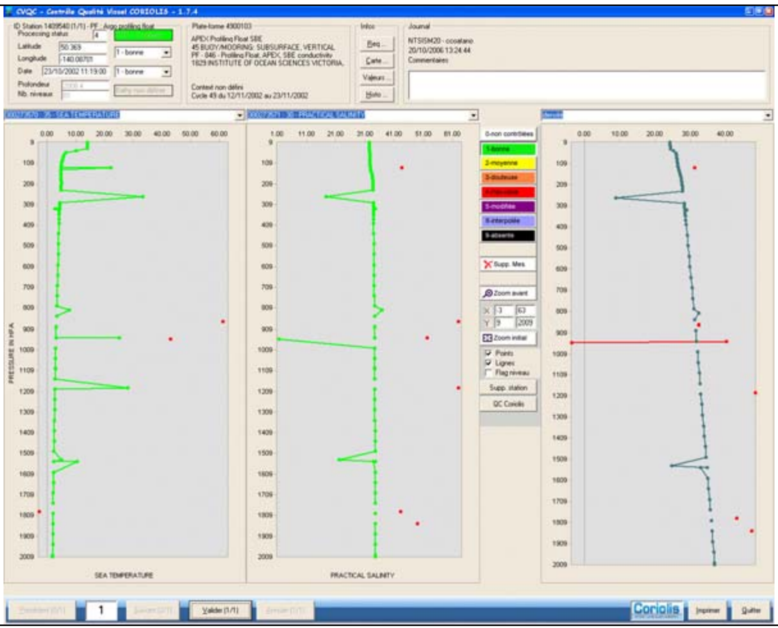
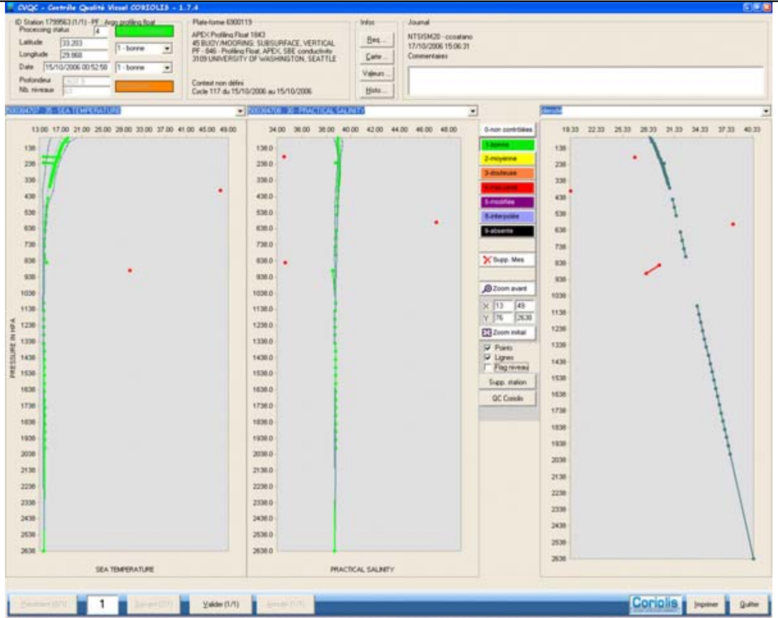
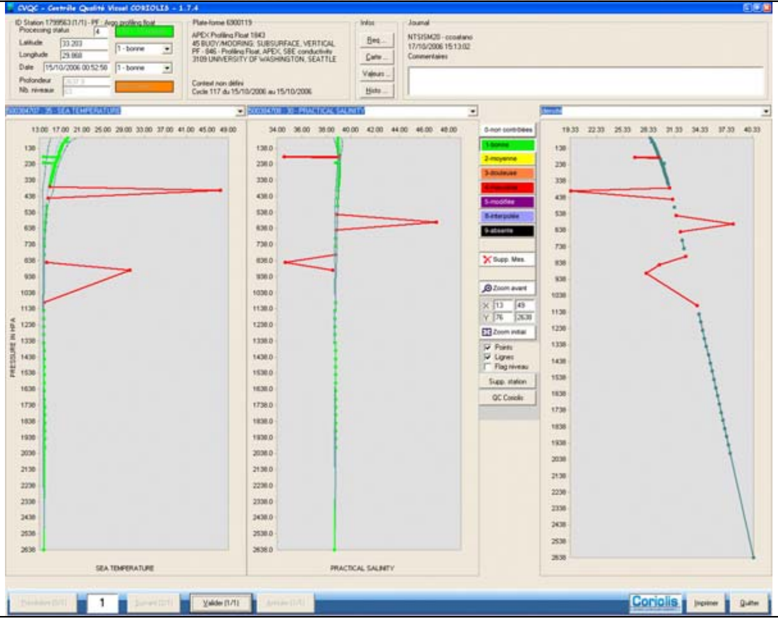
Also, I couldn't get R4900364 to fail the frozen profile test given the criteria in the quality control manual. I can revisit this if you are convinced that it should have failed that test.

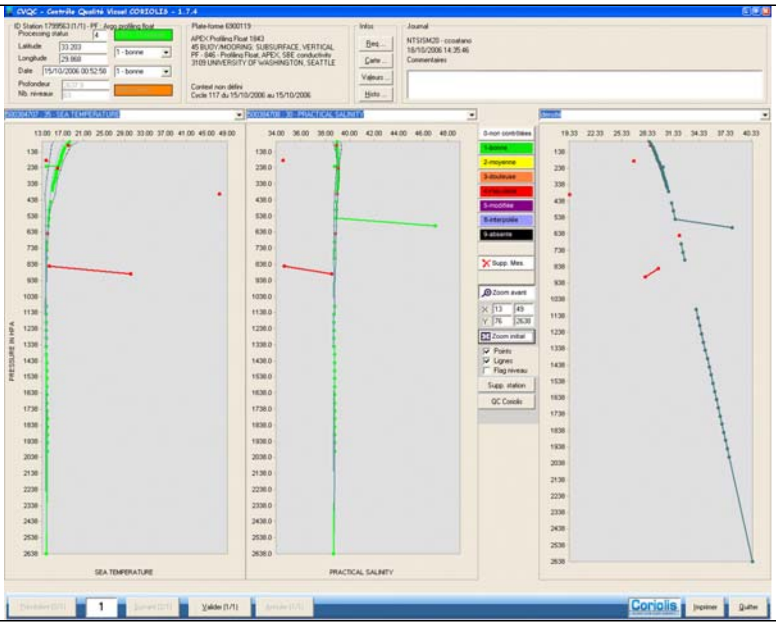
I only returned the relevant profiles. So the T profiles and "all" profiles are included in the individual runs - we don't ever run just a single test. Sorry this took so long - even now, we are still installing our new software. "

1.6. CORIOLIS

Operator : Christine Coatanoan e-mail Christine.coatanoan@ifremer.fr

TEST	CORIOLIS RESULTS
Test 19- Deepest pressure	 CVQC - Contrôle Qualité Visuel CORIOLIS - 1.7.4 ID Station 1799565 (1/1) - PF - Argo profiling float Processing status 4 Latitude 0.137 1 - bonne Longitude -19.242 Date 07/07/2005 14:57:00 1 - bonne Profondeur Nb. niveaux Plate-forme 1900521 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX 00 UNKNOWN OR NOT DEFINED PF - 846 - Profiling Float, APEX, SBE conductivity XXXX Unknown institution Context non défini Cycle 4 du 07/07/2005 au 07/07/2005 Journal NTSISM20 - ccoatano 18/10/2006 16:27:12 Commentaires
Test 2 – Bad date	OK - JULD_QC = "4" ;
Test 5 – Impossible speed test	OK - POSITION_QC = "4" ;

Test 6 – Global Range	
Test 8 – Pressure increasing test	Database sort the data - To be implemented
Test 9 – Spike test	
Test 11 – Gradient test	

Test 14 – Density inversion	 CVQC - Contrôle Qualité Visuel CORIOLIS - 1.7.4 Processing status 4 Latitude 33.203 1 - bonne Longitude 29.868 Date 15/10/2006 00:52:58 1 - bonne Plate-forme 6900119 APEX Profiling Float 1843 45 BUOY/MOORING: SUBSURFACE, VERTICAL PF - 846 - Profiling Float, APEX, SBE conductivity 3109 UNIVERSITY OF WASHINGTON, SEATTLE Contexte non défini Cycle 117 du 15/10/2006 au 15/10/2006 Journal NTSISM20 - ccoatano 18/10/2006 14:35:46 Commentaires
Test 16 – Gross salinity or temperature sensor drift	OK – the flags on salinity of all the profile of the cycle 6 are 3
Test 18 – Frozen profile	Test needs to be more implemented

All the good profiles have passed successfully the automatic tests.

1.7. INCOIS

Operator : T V S Udaya Bhaskar e-mail uday@incois.gov.in

<u>Comparison of results between the output from INCOIS and Coriolis.</u>

1900044 Coriolis 1498.5 4 42.636 4 3.304 4 1000.055 4 Incois 1498.5 1 42.636 4 3.304 4 1000.055 4 But there is not test which says that if T or S or T and S failed any test the pressure values should be flagged as 4. Coriolis 4916.0 4 5.973 4 57.667 4 1066.375 4 Incois 4916.0 1 5.973 4 57.667 4 1066.375 4 Failed to flag pressure as 4 – Deepest Pressure test need to rectified.
1900074 Impossible Speed test is detected using Visual QC. Accordingly the Quality flag of the position is changed to bad.
1900122 Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.
1900380 Date field is missing in the profile. So processing stopped proceeding further. Deepest Pressure test failed from 2163.6 till 6362.1 and these flags are given as 1 instead of 4. These

flags are changed to 4 using Visual QC.

1900521

Coriolis

```
219.0  1    6.805  1    17.676  1   1014.856  1
```

Incois

```
219.0   1      6.805   4      17.676   4    1014.856   4
```

Spike test and Density inversion test failed for Incois but not for Coriolis.

Coriolis

```
3039.4  4    17.925  4    15.111  4   1023.429  4
3391.4  4    39.539  4    50.439  4   1043.271  4
5161.6  4    14.001  4     3.158  4   1024.520  4
6221.5  4    42.183  4    58.161  4   1058.417  4
```

Incois

```
3039.4   1      17.925   4      15.111   4    1023.429   4
 3391.4   1      39.539   4      50.439   4    1043.271   4
 5161.6   1      14.001   4       3.158   4    1024.520   4
 6221.5   1      42.183   4      58.161   4    1058.417   4
```

Again here Deepest Pressure test failed for Incois. This test need to rectified so that the pressure flags are correctly flagged as 4.

1900541

Cycle – 6

Coriolis

```
  7.0  1    24.296  1    34.998  3   1023.584  1
 13.0  1    24.300  1    34.924  3   1023.553  1
```

Incois

```
   7.0   1      24.296   4      34.998   4    1023.584   4
  13.0   1      24.300   4      34.924   4    1023.553   4
```

Density inversion test failed.

All salinity flags are set to 3 in Coriolis and they are set to 1 in Incois profile. The sensor drift test need to implemented. But these flags are set to 3 using VQC by comparing with the previous T/S profile.

2900398

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

2900410

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

3900259

Coriolis

```
3455.9  4     5.591  4    34.170  4   1042.360  4
4899.6  4     6.091  4    64.591  4   1071.615  4
4930.2  4     3.044  4     6.263  4   1027.988  4
```

Incois

```
3455.9   1       5.591   1      34.170   4    1042.360   4
 4899.6   1       6.091   1      64.591   4    1071.615   4
 4930.2   1       3.044   4       6.263   4    1027.988   4
```

Bottom most pressure test failed with incois output.

Coriolis

```
  4.4  1     6.085  4    34.048  4   1026.810  4
  9.2  1     6.087  4    34.047  4   1026.831  4
 19.1  1    54.761  4    14.192  4    996.333  4
4930.2  4     3.044  4     6.263  4   1027.988  4
4899.6  4     6.091  4    64.591  4   1071.615  4
 49.5  4     6.012  4    34.067  4   1027.042  4
 878.9  4     5.935  4    34.051  4   1030.832  4
 69.1  1     5.928  4    34.052  4   1027.132  4
 79.0  1     5.918  4    34.052  4   1027.178  4
 88.9  1     5.911  4    34.052  4   1027.225  4
  0.0  1     5.376  4     0.000  4    999.960  4
 169.4  4     5.607  4    34.153  4   1027.714  4
3455.9  4     5.591  4    34.170  4   1042.360  4
 189.5  1     5.617  4    34.178  4   1027.825  4
```

```
 199.4  1    5.505  4   34.056  4   1027.788  4
 209.0  1    5.495  4   34.250  4   1027.987  4
 219.2  1    5.491  4   34.189  4   1027.987  4
 226.2  1    5.494  4   34.193  4   1028.021  4
 239.2  1    5.491  4   34.199  4   1028.087  4
 249.3  1    5.470  4   34.197  4   1028.134  4
 258.9  1    5.460  4   34.200  4   1028.182  4
 269.3  1    5.436  4   34.198  4   1028.231  4
 279.3  1    5.418  4   34.198  4   1028.279  4
 288.8  1    5.399  4   34.197  4   1028.325  4
 299.0  1    5.376  4   34.196  4   1028.374  4
 308.9  1    5.362  4   34.196  4   1028.421  4
 319.3  1    5.353  4   34.196  4   1028.470  4
 329.6  1    5.352  4   34.198  4   1028.519  4
 339.3  1    5.349  4   34.200  4   1028.566  4
 349.4  1    5.348  4   34.202  4   1028.614  4
 359.3  1    5.343  4   34.203  4   1028.661  4
 379.5  1    5.320  4   34.203  4   1028.756  4
 399.3  1    5.287  4   34.203  4   1028.852  4
 449.2  1    5.218  4   34.200  4   1029.087  4
 498.9  1    5.110  4   34.199  4   1029.328  4
 549.1  1    4.990  4   34.199  4   1029.574  4
 599.2  1    4.865  4   34.205  4   1029.824  4
 648.9  1    4.754  4   34.208  4   1030.068  4
 698.8  1    4.668  4   34.229  4   1030.324  4
 749.0  1    4.481  4   34.247  4   1030.592  4
 799.5  1    4.300  4   34.258  4   1030.854  4
 849.4  1    4.074  4   34.273  4   1031.123  4
 899.3  1    3.912  4   34.292  4   1031.386  4
 949.3  1    3.736  4   34.312  4   1031.652  4
 999.1  1    3.561  4   34.329  4   1031.915  4
1049.2  1    3.410  4   34.347  4   1032.177  4
1099.6  1    3.274  4   34.366  4   1032.439  4
1149.4  1    3.155  4   34.387  4   1032.698  4
1198.9  1    3.055  4   34.405  4   1032.950  4
   0.0  1    2.677  4   34.529  4   1027.538  4
1549.5  1    2.619  4   34.548  4   1034.713  4
1599.1  1    2.577  4   34.561  4   1034.954  4
1649.1  1    2.535  4   34.575  4   1035.197  4
1699.3  1    2.489  4   34.585  4   1035.438  4
1749.0  1    2.443  4   34.595  4   1035.677  4
1799.3  1    2.400  4   34.605  4   1035.918  4
1849.3  1    2.364  4   34.614  4   1036.156  4
1898.9  1    2.317  4   34.624  4   1036.394  4
1948.6  1    2.281  4   34.631  4   1036.629  4
Incois
    0.0   1     2.677   4    34.529   4    1027.538   4
    0.0   1     5.376   4     0.000   4     999.960   4
    4.4   1     6.085   1    34.048   4    1026.810   4
    9.2   1     6.087   4    34.047   4    1026.831   4
   19.1   1    54.761   4    14.192   4     996.333   4
   49.5   1     6.012   4    34.067   4    1027.042   4
   69.1   1     5.928   1    34.052   1    1027.132   1
   79.0   1     5.918   1    34.052   1    1027.178   1
   88.9   1     5.911   1    34.052   1    1027.225   1
  169.4   1     5.607   1    34.153   1    1027.714   1
  189.5   1     5.617   1    34.178   1    1027.825   1
  199.4   1     5.505   4    34.056   4    1027.788   4
  209.0   1     5.495   1    34.250   1    1027.987   1
  219.2   1     5.491   1    34.189   1    1027.987   1
  226.2   1     5.494   1    34.193   1    1028.021   1
  239.2   1     5.491   1    34.199   1    1028.087   1
  249.3   1     5.470   1    34.197   1    1028.134   1
  258.9   1     5.460   1    34.200   1    1028.182   1
  269.3   1     5.436   1    34.198   1    1028.231   1
  279.3   1     5.418   1    34.198   1    1028.279   1
```

```
  288.8   1      5.399   1     34.197   1    1028.325   1
  299.0   1      5.376   1     34.196   1    1028.374   1
  308.9   1      5.362   1     34.196   1    1028.421   1
  319.3   1      5.353   1     34.196   1    1028.470   1
  329.6   1      5.352   1     34.198   1    1028.519   1
  339.3   1      5.349   1     34.200   1    1028.566   1
  349.4   1      5.348   1     34.202   1    1028.614   1
  359.3   1      5.343   1     34.203   1    1028.661   1
  379.5   1      5.320   1     34.203   1    1028.756   1
  399.3   1      5.287   1     34.203   1    1028.852   1
  449.2   1      5.218   1     34.200   1    1029.087   1
  498.9   1      5.110   1     34.199   1    1029.328   1
  549.1   1      4.990   1     34.199   1    1029.574   1
  599.2   1      4.865   1     34.205   1    1029.824   1
  648.9   1      4.754   1     34.208   1    1030.068   1
  698.8   1      4.668   1     34.229   1    1030.324   1
  749.0   1      4.481   1     34.247   1    1030.592   1
  799.5   1      4.300   1     34.258   1    1030.854   1
  849.4   1      4.074   1     34.273   1    1031.123   1
  878.9   1      5.935   4     34.051   4    1030.832   4
  899.3   1      3.912   1     34.292   1    1031.386   1
  949.3   1      3.736   1     34.312   1    1031.652   1
  999.1   1      3.561   1     34.329   1    1031.915   1
 1049.2   1      3.410   1     34.347   1    1032.177   1
 1099.6   1      3.274   1     34.366   1    1032.439   1
 1149.4   1      3.155   1     34.387   1    1032.698   1
 1198.9   1      3.055   1     34.405   1    1032.950   1
 1549.5   1      2.619   1     34.548   1    1034.713   1
 1599.1   1      2.577   1     34.561   1    1034.954   1
 1649.1   1      2.535   1     34.575   1    1035.197   1
 1699.3   1      2.489   1     34.585   1    1035.438   1
 1749.0   1      2.443   1     34.595   1    1035.677   1
 1799.3   1      2.400   1     34.605   1    1035.918   1
 1849.3   1      2.364   1     34.614   1    1036.156   1
 1898.9   1      2.317   1     34.624   1    1036.394   1
 1948.6   1      2.281   1     34.631   1    1036.629   1
```

The data is sorted by pressure before it is passed to Automatic Quality Control. So the difference in flags in both the outputs.

4900103

Coriolis

```
130.2  1   22.202  1   43.532  4   1031.218  4
272.4  1   33.448  1   17.772  1   1008.891  1
873.5  1   61.342  4   62.979  4   1032.455  4
951.6  1   25.210  1   52.223  4   1040.341  4
 955.8  1   43.093  4    1.706  1   996.397  4
1194.0  1   28.062  1   62.912  4   1048.454  4
1549.6  1   10.481  1   33.988  1   1032.976  1
1790.0  1   -2.748  4   43.106  4   1043.213  4
1847.9  1    1.953  1   48.903  4   1047.484  4
```

Incois

```
  130.2   1     22.202   4     43.532   4    1031.218   4
272.4   1     33.448   4     17.772   4    1008.891   4
  873.5   1     61.342   4     62.979   4    1032.455   4
  951.6   1     25.210   4     52.223   4    1040.341   4
  955.8   1     43.093   4      1.706   4     996.397   4
1194.0   1     28.062   4     62.912   4    1048.454   4
1549.6   1     10.481   4     33.988   4    1032.976   4
1790.0   1     -2.748   4     43.106   4    1043.213   4
1847.9   1      1.953   1     48.903   4    1047.484   4
```

We observe that in coriolis output spike test and density inversion failed to flag the T/S as 4 and instead they are flagged as good data sets. Because of the presence of many spikes in the T/S, data above and below these spiky data are also flagged as 4 which is not present in coriolis output. Such profiles can be visually checked and the QC flagged can be changed accordingly.

4900272

Cycle #2
Bad position information provided.
Cycle #3
Bad position information provided.
Could not perfume RTQC on the data.

4900364

Cycle #102
Coriolis

```
 5.0  1   21.269  3   36.575  3  1025.643  1
 15.0  1   21.275  3   36.572  3  1025.682  1
 25.0  1   21.278  3   36.573  3  1025.725  1
 35.0  1   21.278  3   36.573  3  1025.769  1
 45.0  1   21.281  3   36.573  3  1025.811  1
 55.0  1   21.281  3   36.574  3  1025.856  1
 65.0  1   21.290  3   36.573  3  1025.896  1
 75.0  1   21.294  3   36.572  3  1025.937  1
 85.0  1   21.295  3   36.573  3  1025.981  1
 95.0  1   21.296  3   36.575  3  1026.026  1
105.0  1   21.299  3   36.573  3  1026.067  1
115.0  1   21.300  3   36.574  3  1026.110  1
125.0  1   21.301  3   36.574  3  1026.154  1
135.0  1   21.522  3   36.557  3  1026.122  1
145.0  1   20.487  3   36.628  3  1026.505  1
155.0  1   20.213  3   36.616  3  1026.614  1
165.0  1   19.907  3   36.607  3  1026.732  1
175.0  1   19.709  3   36.599  3  1026.823  1
185.0  1   19.492  3   36.590  3  1026.917  1
195.0  1   19.315  3   36.585  3  1027.003  1
210.0  1   19.146  3   36.571  3  1027.102  1
230.0  1   18.967  3   36.561  3  1027.228  1
250.0  1   18.835  3   36.555  3  1027.345  1
270.0  1   18.717  3   36.548  3  1027.457  1
290.0  1   18.638  3   36.539  3  1027.557  1
310.0  1   18.561  3   36.533  3  1027.660  1
330.0  1   18.455  3   36.520  3  1027.764  1
350.0  1   18.307  3   36.505  3  1027.878  1
370.0  1   18.263  3   36.498  3  1027.970  1
390.0  1   18.153  3   36.483  3  1028.074  1
425.0  1   17.868  3   36.444  3  1028.269  1
475.0  1   17.347  3   36.366  3  1028.558  1
525.0  1   16.760  3   36.268  3  1028.846  1
575.0  1   16.087  3   36.154  3  1029.140  1
625.0  1   15.120  3   35.985  3  1029.457  1
675.0  1   14.015  3   35.798  3  1029.784  1
725.0  1   12.666  3   35.589  3  1030.135  1
775.0  1   11.490  3   35.416  3  1030.465  1
825.0  1   10.517  3   35.307  3  1030.793  1
875.0  1    9.306  3   35.178  3  1031.142  1
925.0  1    8.225  3   35.092  3  1031.490  1
```

Incois

```
  5.0   1     21.269   1     36.575   1    1025.643   1
  15.0   1     21.275   1     36.572   1    1025.682   1
  25.0   1     21.278   1     36.573   1    1025.725   1
  35.0   1     21.278   1     36.573   1    1025.769   1
  45.0   1     21.281   1     36.573   1    1025.811   1
  55.0   1     21.281   1     36.574   1    1025.856   1
  65.0   1     21.290   1     36.573   1    1025.896   1
  75.0   1     21.294   1     36.572   1    1025.937   1
  85.0   1     21.295   1     36.573   1    1025.981   1
  95.0   1     21.296   1     36.575   1    1026.026   1
 105.0   1     21.299   1     36.573   1    1026.067   1
 115.0   1     21.300   1     36.574   1    1026.110   1
 125.0   1     21.301   1     36.574   1    1026.154   1
 135.0   1     21.522   4     36.557   4    1026.122   4
 145.0   1     20.487   1     36.628   1    1026.505   1
```

```
  155.0   1     20.213   1     36.616   1    1026.614   1
  165.0   1     19.907   1     36.607   1    1026.732   1
  175.0   1     19.709   1     36.599   1    1026.823   1
  185.0   1     19.492   1     36.590   1    1026.917   1
  195.0   1     19.315   1     36.585   1    1027.003   1
  210.0   1     19.146   1     36.571   1    1027.102   1
  230.0   1     18.967   1     36.561   1    1027.228   1
  250.0   1     18.835   1     36.555   1    1027.345   1
  270.0   1     18.717   1     36.548   1    1027.457   1
  290.0   1     18.638   1     36.539   1    1027.557   1
  310.0   1     18.561   1     36.533   1    1027.660   1
  330.0   1     18.455   1     36.520   1    1027.764   1
  350.0   1     18.307   1     36.505   1    1027.878   1
  370.0   1     18.263   1     36.498   1    1027.970   1
  390.0   1     18.153   1     36.483   1    1028.074   1
  425.0   1     17.868   1     36.444   1    1028.269   1
  475.0   1     17.347   1     36.366   1    1028.558   1
  525.0   1     16.760   1     36.268   1    1028.846   1
  575.0   1     16.087   1     36.154   1    1029.140   1
  625.0   1     15.120   1     35.985   1    1029.457   1
  675.0   1     14.015   1     35.798   1    1029.784   1
  725.0   1     12.666   1     35.589   1    1030.135   1
  775.0   1     11.490   1     35.416   1    1030.465   1
  825.0   1     10.517   1     35.307   1    1030.793   1
  875.0   1      9.306   1    35.178   1    1031.142   1
  925.0   1      8.225   4    35.092   1    1031.490   4
```

Density inversion at pressure 135.0, Frozen profile test is not implemented hence the flags are set to 1 instead of 3.

4900528

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

5900031

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

59000912

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

6900119

Coriolis

```
  99.5  1    18.010  4    38.941  4    1028.727  4
189.2  1    16.517  1    39.028  4    1029.557  4
 192.4  1    13.741  4    34.516  4    1026.724  4
 199.4  1    16.408  1    39.044  4    1029.640  4
230.1  1    13.725  4    38.735  4    1030.155  4
 239.3  1    15.903  4    39.047  4    1029.939  4
379.5  1    14.837  4    38.966  1    1030.741  4
 399.6  1    47.489  4    38.948  4    1019.338  4
 449.4  1    14.462  4    38.906  1    1031.087  4
549.4  1    14.135  1    38.845  4    1031.552  4
 598.9  1    14.007  4    47.007  4    1038.104  4
 649.1  1    13.932  4    38.797  4    1031.998  4
799.0  1    13.793  1    38.760  4    1032.656  4
 849.2  1    14.303  4    34.657  4    1029.606  4
 899.1  1    30.144  4    38.492  4    1028.088  4
1099.1  1    13.718  4    38.731  1    1033.956  4
2637.9  4    13.730  4    38.674  4    1040.479  4
```

Incois

```
   99.5   1     18.010   4     38.941   4    1028.727   4
  189.2   1     16.517   1     39.028   4    1029.557   4
  192.4   1     13.741   4     34.516   4    1026.724   4
  199.4   1     16.408   1     39.044   4    1029.640   4
  230.1   1     13.725   1     38.735   1    1030.155   1
  239.3   1     15.903   4     39.047   4    1029.939   4
  379.5   1     14.837   4     38.966   1    1030.741   4
  399.6   1     47.489   4     38.948   4    1019.338   4
```

449.4	1	14.462	4	38.906	1	1031.087	4
549.4	1	14.135	1	38.845	4	1031.552	4
598.9	1	14.007	1	47.007	4	1038.104	4
649.1	1	13.932	4	38.797	4	1031.998	4
799.0	1	13.793	1	38.760	4	1032.656	4
849.2	1	14.303	4	34.657	4	1029.606	4
899.1	1	30.144	4	38.492	4	1028.088	4
1099.1	1	13.718	4	38.731	1	1033.956	4
2637.9	1	13.730	1	38.674	1	1040.479	1

No gradients detected at pressure level 230.1 and all the flags are set to 1 where as in coriolis all of them are set to 4. Deepest pressure test failed with incois profile and hence the pressure value 2637.9 is not flagged as 4.

6900367

Outputs from INCOIS tests and Coriolis found to be matching. No anomalies found in this profile.

Standard Test Results of the Automatic Quality Control at INCOIS

SNo	Float ID	Problem detected by the test	Test Failed
1	**1900044**	Temp = 42.636 and Sal = 3.304 at pressure 1498.5 Temp = 5.973 and Sal = 57.667 at Pressure 4916.0 Temperature and Salinity at (1449.4, 2.823, 34.496) and (1499.5, 2.751, 34.523) are flagged as 4 due the wrong T/S values at pressure 1498.5	Global range for T/S failed Bottom Pressure Test failed These flags can be eliminated using VQC
2	**1900074**	Cycle 123 (Lon, Lat) – (31.217,-39.770) Cycle 124 (Lat, Lon) – (38.022, -73.445)	Failed Impossible speed test Identified using VQC
3	**1900122**	No anomalies found in the data set	Passed all the QC tests
4	**1900380**	Missing Date of surfacing. Data is not further passed to RTQC tests When all the test are run with a hypothetical date, Bottom most Pressure test failed from 2163.6 till 6362.1	Data is rejected and no NetCDF file is generated Bottom pressure Test need to rechecked.
5	**1900521**	Temp = 6.085 Sal = 17.676 and Pressure = 219.0 Sal at 209 and 268 are flagged as 4 due to spike at 219.0 Pressure values 3039.4, 3391.4, 5161.6, 6221.5 and associated Temp and Salinity values are flagged as 4 Temperature and Salinity at pressure 1987.7 are flagged 4 due to wrong T/S at 3039.4.	Spike test failed. Can be eliminated using VQC. Failed bottom most pressure test. Can be eliminated using VQC
6	**1900541**	Density inversion observed at pressure values 7.0 and 13.0 and associated density values are 1023.584 and 1023.553	Failed density inversion test
7	**2900398**	No anomalies found in the data set	Passed all the QC tests
8	**2900410**	No anomalies found in the data set	Passed all the QC tests
9	**3900259**		

		No Latitude and Longitude given. Pres = 19.1 , Temp = 54.761, Sal = 14.192 Pres = 878.9 , Temp = 5.935, Sal = 34.051 Pres = 4899.6, Temp = 6.091, Sal = 64.591 Pressure values of 3455.9, 4899.6, 4930.2	Density inversion and Global range T/S test failed. Density inversion test failed. Global range T/S test failed Bottom Pressure test failed. Checked through VQC.
10	4900103	Spike at Pres = 130.2 , T = 22.202 and Salinity = 43.532 Density inversion at pres = 139.6 where in density value is 1026.779 due to the spike at 130.2 Spike in T/S at pres = 272.4 with T = 33.448 and S = 17.772 T/S at 239.5 and 299.2 are flagged as 4 due to the spike at pres = 272.4 Density inversion at 339.4. Associated temp = 4.246 and sal = 3.926 Spike at pres = 819.0 respective temp = 7.820 and sal = 36.862 Spike at Pres = 873.5 corresponding temp = 61.342 and sal = 62.979 Spike at Pres = 951.6 corresponding temp = 25.210 and sal = 52.223 Spike at Pres = 955.8 corresponding temp = 43.093 and sal = 1.706 Spike at Pres = 1194.0 corresponding temp = 28.062 and sal = 62.912 Spike at Pres = 1549.6 corresponding temp = 10.481 and sal = 33.988 Spike at Pres = 1790.0 corresponding temp = -2.748 and sal = 43.106 Spike at Pres = 1847.9 corresponding temp = 1.953 and sal = 48.903	Failed Spike test and Global range test. Density inversion test. Can be eliminated using VQC. Failed Spike test and Global range test. Can be eliminated using VQC. Density inversion test failed Failed spike test Global range T/S test failed. Failed spike test and Global range test Failed spike test and Global range test Failed spike test and Global range test Failed spike test Failed spike test and Global range test Global range T/S test failed.
11	4900272	Latitude and Longitude are missing in the netcdf file	
12	4900364	Pres = 135.0 Temp = 21.522 and Sal = 36.557 Pres = 925.0 Temp = 8.225 and Sal = 35.092	Density inversion test failed Bottom Spike test failed
13	4900528		

		No anomalies found	Passed all QC tests
14	5900031	No anomalies found	Passed all QC tests
15	5900912	No anomalies found	Passed all QC tests
16	6900119	Pres = 99.5, Temp = 18.010, Sal = 38.941 Pres = 192.4, Temp = 13.741, Sal = 34.516 Pres = 239.3, Temp = 15.903, Sal = 39.047 Pres = 399.6, Temp = 47.489, Sal = 38.948 Pres = 598.9, Temp = 14.007, Sal = 47.007 Pres = 899.1, Temp = 30.144, Sal = 38.492 Pres = 2637.9, Temp = 13.730, Sal = 38.674	Density inversion test failed Density inversion test failed Density inversion test failed Density inversion and Global range T/S test failed. Density inversion and Global range T/S test failed. Spike test and Density inversion test failed. Bottom pressure test failed. Eliminated using VQC.
17	6900367	No anomalies found	Passed all QC tests

<u>Observations</u>:

1. Apart from this quality control flags marked as 4 above and below, due to spikes in between are visually checked and changed accordingly.
2. Bottom most pressure for all the profiles are to be provided for Deepest Pressure test. This information will be present in the metadata of each of the profile or from the '01' packet in the hexadata.
3. Tests like impossible speed, Frozen profile, Bottom most pressure test , sensor drift tests are checked using Visual Quality Control and accordingly flags are updated and the profiles are uploaded into GDAC.
4. One general observation is that none of the DACS seems to be using stuck value tests as there are profile in which values of T/S are stuck and still the QC flags are shown as 1.
5. Very soon those test mentioned in point 2 which are being done using VQC will be automated. Until then the profiles will be visually checked for the correct flags and are uploaded on to GDAC.

1.8. JMA

Operator : Takashi Yoshida e-mail tyoshida@met.kishou.go.jp

Here is the results (QCed netCDF files) and comment on each test.

Data set :
R1900541_006_jmaall.nc
R3900259_057_jmaall.nc
R1900044_121_jmaall.nc
R6900119_117_T11_jmaall.nc
R6900119_117_T14_jmaall.nc
R4900103_049_jmaall.nc

R1900380_000_jmaall.nc R4900103_049_T9_jmaall.nc

TEST 18, 19
JMA has not operationally applied the tests yet.

TEST 2
JMA tests both of JULD and JULD_LOCATION.
Result are written in JULD_QC and POSITION_QC respectively.

TEST 5
We did not attempt this because our system use trajectory data for the test 5.

TEST 6, 16
The result is the same as yours.

TEST 8, 9, 11, 14
Different results.

1.9. KMA

Operator : Chang-Woo Cho e-mail chokudan@metri.re.kr

A work has been done on different floats, not on the standard set sent for the action 23 of the ADMT7.

DAC	TEST	Name_test	FLOAT(WMOID)	CYCLE	AREA	TYPE	FILENAME after TEST
KMA	6	Global range	2900639	29	East/Japan sea	APEX	R2900639_029.nc
			2900526	82	East/Japan sea		R2900526_082.nc
	8	Pressure increasing test	2900639	29	East/Japan sea		R2900639_029.nc
	9	Spike test	2900437	113	East/Japan sea		R2900437_113.nc
	11	Gradient test	2900309	119	NW Pacific		R2900309_119.nc
	12	Digit rollover test	2900441	91	East/Japan sea		R2900441_091.nc
	14	Density inversion	2900309	119	NW Pacific		R2900309_119.nc
			2900431	87	NW Pacific		R2900431_087.nc
	Good profile		2900433	90	NW Pacific		R2900433_090.nc

Dataset with results (standard_test_KMA.zip) :
R2900309_119.nc R2900433_090.nc R2900441_091.nc R2900639_029.nc
R2900431_087.nc R2900437_113.nc R2900526_082.nc

1.10. MEDS

Operator :Anh Tran e-mail TranA@DFO-MPO.GC.CA

Note: The output from MEDS QC is in line (a), and the original data provided is in line (b)

1. 1900044_121.nc

This profile failed the following tests: global range, region range, spike and deepest pressures tests.
We flagged the same salinity value as of the test data. However, we didn't flag depth as "4". Below is the difference between Meds QC and original data sets
Temperature profile:
a) 1498.5 1 42.636 4
b) 1498.5 4 42.636 4
Salinity profile
a) 1498.5 1 3.304 4
b) 1498.5 4 3.304 4

2. 1900074_123.nc – no difference with the original data set. Measured data passed QC.
3. 1900074_124.nc – the position flagged as bad as in original data.

4. 1900122_049.nc – data passed QC without failing any test. Same result as the test data set

5. 1900144_066.nc
The profile failed the following tests: global range and deepest pressure test. We assigned flag of "4" for temperature not "2" as in the original data set
Temperature profile:
a) 5224.4 4 11.084 4 318.9 1 10.963 1
b) 5224.4 4 11.084 2 318.9 1 10.963 2
Salinity profile
a) 5224.4 4 35.112 4
b) 5224.4 4 35.112 2

6. 190038_000.nc
This profile failed the following tests: impossible date and time, global range, region range, spike, gradient, digit rollover, density inversion and deepest pressure
There is some discrepancy in assign quality flags
Temperature profile
a) 269.4 1 3.598 3 935.0 1 4.362 3 1242.1 1 5.384 3
2163.6 1 52.482 4 2163.9 1 38.687 4
b) 269.4 1 3.598 4 935.0 1 4.362 4 1242.1 1 5.384 4
2163.6 4 52.482 4 2163.9 4 38.687 4
Salinity profile
a) 115.7 1 2.564 1 883.6 1 15.114 3
2163.6 1 15.114 3 2163.9 1 26.376 4
b) 115.7 1 2.564 4 883.6 1 15.114 4
2163.6 4 15.114 4 2163.9 4 26.376 4

7. 190038_000.nc same as above
8. 1900521_004.nc
This profile failed the following tests: global range, region range, spike, gradient and deepest pressure tests.
Temperature profile:
a) 219.0 1 6.805 4
b) 219.0 1 6.805 1
Salinity profile
a) 219.0 1 17.676 4
b) 219.0 1 17.676 1

9. 1900521_004.nc after all tests
This profile failed the following tests: global range, region range, spike, gradient and deepest pressure tests.
Temperature profile
a) 1987.8 1 3.511 1
b) 1987.8 1 3.511 4
Salinity profile
a) 209.0 1 35.356 1 268.9 1 35.219 1
b) 209.0 1 35.356 4 268.9 1 35.219 4

10. 4900541_005.nc -This profile passed all the tests
11. 4900541_006.nc
This profile failed gross salinity or temperature sensor drift

12. 2900398_186.nc - This profile is good.
13. 2900410_004.nc -This profile is good
14.
15. 4900103_049.nc

This profile failed the following tests: Global range, region range, spike, density inversion. There are many differences in QC flags at different levels. An example of difference are showed below
Temperature profile
a) 130.2 1 22.202 4 239.5 1 4.700 1 272.4 1 33.448 4
349.2 1 4.216 3 819.0 1 7.820 4 949.3 1 3.061 4
951.6 1 25.210 4 1194.0 1 28.062 4 1249.1 1 2.662 4
1540.6 1 4.927 4 1549.6 1 10.481 4 1699.1 1 2.144 3
1749.4 1 2.101 4
b) 130.2 1 22.202 1 239.5 1 4.700 1 272.4 1 33.448 1
349.2 1 4.216 1 819.0 1 7.820 1 949.3 1 3.061 1
951.6 1 25.210 1 1194.0 1 28.062 1 1249.1 1 2.662 1
1540.6 1 4.927 1 1549.6 1 10.481 1 1699.1 1 2.144 1
1749.4 1 2.101 1
Salinity profile
a) 272.4 1 17.772 4 309.1 1 33.890 4
b) 272.4 1 17.772 1 309.1 1 33.890 1

17. 4900364_101.nc
This profile failed gross salinity.
4900364_102.nc
This profile also failed gross salinity instead of frozen profile.
18. 4900528_091.nc -This profile passed all the QC tests
19. 5900531_020.nc -This profile passed all of the QC tests
20. 5900912_014.nc -This profile passed all of the tests
21. 6900119_117.nc
This profile failed the following tests: Global range, region range, spike, density inversion and deepest pressure
Temperature profile:
a) 99.5 1 18.010 1 192.4 1 13.741 3 230.1 1 13.725 1
239.3 1 15.903 1 379.5 1 14.837 1 449.4 1 14.462 1
b) 99.5 1 18.010 4 192.4 1 13.741 4 230.1 1 13.725 4
239.3 1 15.903 4 379.5 1 14.837 4 449.4 1 14.462 4
Salinity profile:
a) 99.5 1 38.941 1 189.2 1 39.028 1 230.1 1 38.735 1
b) 99.5 1 38.941 4 189.2 1 39.028 4 230.1 1 38.735 4

22. 6900119_117.nc- this profile failed the same tests as the one above
23. 6900119_117.nc – this profile failed the same tests as the one above
24. 6900367_084.nc – This profile passed all of the tests

* * *