9th ARGO DATA MANAGEMENT MEETING

Honolulu
29th - 31st October 2008

Version 0.2
14th November 2008

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1. Objectives of the meeting

The 9th ADMT meeting was hosted by University of Hawaii, Honolulu, USA. The meeting was opened by Dr Pr Mark Merrifield from the Ocean Department and Director of the University of Hawaii Sea Level Center. He highlighted the fact that data management has become very important in this era of global observation. He showed how the University of Hawaii was using the Argo data for their applications and research activities

The objectives that had been fixed for the meeting were the following:

- Review the actions decided at the 8 th ADMT meeting to improve Real-Time data flow (considering all aspects of the system from transmission from the float to arrival at GDAC and accessibility of data by users)
- Review status of Delayed-Mode quality control and Progress to reduce backlog
- Review the metrics regarding Argo program to document future (and if possible past) growth and performance of:-
    - the Argo array
    - the Argo data system (performance indicators, problem reporting)
    - the uses being made of Argo RT and DM data (user monitoring)
- Feedback from the Regional Argo Data Centre meeting

36 persons from 10 countries and 28 institutes attended the meeting.

2. Feedback from 9th AST meeting (Dean Roemmich and H. Freeland)

The achievements of the Argo Program, deploying a global array of 3000 profiling floats and developing a comprehensive data management system, are widely recognized as a major step for oceanography and climate science. Argo's open data policy and rapid delivery of high quality data are key elements contributing to the program's growth and to the breadth of its user community. While these achievements are substantial and innovative, there are further steps to be taken to realize the full potential of Argo. The top priorities for the coming years are:

(1) to increase float coverage in the southern hemisphere oceans in accord with Argo's original design criterion of 3-degree x 3-degree spacing.
(2) to identify and correct systematic errors in the Argo dataset for global studies of ocean heat content, steric sea level, salinity variability, and similar applications that require the highest quality data.

While improving and expanding Argo, it is essential to maintain the global array for a decade and longer to demonstrate the value of global subsurface ocean sampling in a wide variety of research and operational oceanography applications.

Over half of Argo's floats are in the southern hemisphere, and Argo sampling of the southern oceans is unprecedented. Argo collects more T,S profiles south of 30-degrees S in a single winter than in the entire pre-Argo half century of ocean exploration. Nevertheless, the array has substantial holes in the South Atlantic and South Indian Ocean and is too sparse globally south of 45-degrees S. Several hundred additional floats, as well as effective use of all deployment opportunities, are needed to correct this shortfall. Moreover, the increase in coverage must be achieved in spite of very tight national program funding. In order to do this, the lifetime of profiling floats must continue to increase. Some programs are already achieving the goal of 4-year float lifetime, and further advances are possible. The other necessary element is to decrease the number of floats that are providing unusable data or no profile data.

Better monitoring and quicker diagnosis of technical problems is needed to achieve these goals.

Detection and understanding of global changes in sea level, ocean heat content, and the hydrological cycle are among Argo's important and most publicly visible applications. Systematic errors in Argo data, such as a 2 decibar bias reported in a collection of floats south of Japan by Uchidaand Imawaki (JGR, 2008), are serious if present on a global scale. Time mean systematic errors in Argo data can make it inconsistent with other related datasets such as shipboard hydrography and satellite altimetry. Time-varying systematic errors can introduce spurious signals into global time-series constructed from Argo data. Several specific steps are needed for Argo to proactively pursue the issue of systematic errors:

(1) Data files need to be complete and consistent, not only profile files, but meta-, technical, and trajectory files. This information is essential, including for assessment of the quality of the Argo dataset. Corrective action is needed.
(2) The backlog in delayed-mode quality control must be eliminated. The slow pace of delayed-mode processing delays the discovery of problems, increasing their severity. It further suggests Argo is under-resourced in its data management system. Slow release of delayed-mode data is contrary to Argo's policy of timely and open availability.
(3) Assembly of reference datasets for delayed-mode processing, including recent data, is a critical step toward improved data quality. Argo depends on collaborative efforts with academic and government partners as well as with the Argo Regional Centers, to identify and process reference-quality shipboard CTD data. Recent CTD data from the southern hemisphere is a priority.
(4) Development of innovative techniques for identification of systematic problems, including Altimetric QC methods and objective analysis to identify outlier instruments, is proving to be very valuable. Further effort in this direction is encouraged.

Finally, increasing Argo's user community will help not only to demonstrate the value of the Argo Program. New users will help to define the requirements for Argo and their applications will reveal areas where improvements in data quality can be made. In the coming years Argo's user community can increase by an order of magnitude through education, outreach, and improved access to Argo data and products

Follow-up discussion:

- While the Argo program is advertising more than 3000 floats, the actual number reporting good profiles is smaller. In the future, the number of floats reporting good profiles will be promoted.
- As evidence of the need to re-prioritize resources, it was noted that the DM operator at WHOI (Paul Robbins) was hired at the expense of new floats.

3. Status of Argo Program and link with Users

3.1. Review of the Action from last ADMT

Sylvie Pouliquen reviewed the action list from last ADMT and pointed out that most of the actions were finalized in the weeks prior to the meeting while the deadlines were much earlier. Nonetheless a lot of the actions have been either completed or started. Mostly actions related to trajectory were behind schedule because of lack of manpower. See the annex 3 for detailed status.

For the ADMT to be an effective organization and for the good the entire Argo program, **the entire ADMT must be more responsive to the action list in the future!** In that spirit, Megan Scanderbeg will assist the co-chairs with action item tracking and "motivating" the responsible parties as target dates are approached.

3.1. Argo Status and AIC development (M Belbéoch)

The Argo technical Coordinator presented the status of the Argo array. He pointed out that there was a need to count the number of floats sending good quality data and to reflect that count on AIC website (2700 good floats amongst 3200 active floats, as of October 2008).

He recalled that the float operators made substantial progress in updating the deployment plans and invited them to continue the efforts. He highlighted that the deployment plans were consistent with the present and future gaps identified in the Argo array. He presented also a set of metrics describing the array status and highlighted the fact that the number of floats equipped with additional sensors was increasing. He presented then the status of JCOMMOPS (and the JCOMM OPSC), which is expanding its activities to OceanSITES coordination. He recalled in particular that he will shortly start technical coordination of the SOT program early 2009.

Thanks to a new I.T resource that started to work at JCOMMOPS in September 2008, new web sites will be developed in 2009-2010, with the goal to clarify access to information and better achieve integration of JCOMMOPS web services. Technical specifications of the new website(s) will be presented to the Argo community. S Pouliquen suggested that the architecture allows to adapt to the profile of the person surfing through the network (project manager, float deployer, data manager, research users, operational user..)

The AIC website audience was then presented and TC concluded that the website was reaching its international target and was regularly used by Argonauts, and sometimes by a larger public.

The Argo TC updated the list of delayed-mode operators and identified volunteers for 'orphan floats'. He will communicate the results through the appropriate mailing lists.

The co-chairs requested the ADMT to regularly use the AIC monthly report and follow up on required actions.

TC presented then the support/feedback centre and reminded the ADMT that they had to:

i) promote http://support.argo.net on all Argo websites

ii) channel all feedback on data quality (from individuals, ARCs, ..) through the AIC.

He finally proposed to host the next session of the ADMT, in Toulouse/France.

More information in the AIC report (see Annex).

3.2. Aquarius/SAC-D Salinity Satellite Summary – John Gunn

The Aquarius/SAC-D satellite Validation Data System continues the collection of Argo data profiles in preparation for the calibration/validation tasks during the satellite mission. The AVDS retrieves 250-300 near surface values of SSS daily and has done so for approximately 28 months. Concurrent match up with actual temperature (SST) satellite data established the basic functionality of the system and has been suspended until the onset of the next test phase. A 30-day simulation of SSS is currently being used for development of match-up algorithms and other software development. Simulated instrument and environmental noise sources provide an estimate of instrument performance using a GCM SSS field as input.

Analysis of thermosalinograph data was used to estimate two of the errors associated with a comparing a point source measurement such as a CTD profile with an area average measurement such as the radiometer footprints of the satellite sensor. Estimates put this error in the same range as the anticipated satellite SSS error (~0.2 psu).

Enhanced Argo float with a CTD sensor that will measure data between the surface and the normal 5 m cutoff depth of standard Argo floats is under development at the University of Washington. Six of these floats will be deployed in the Pacific warm pool in February 2009 with an additional four to be deployed soon in an as yet undetermined location. Prototypes show very good agreement between "enhanced" and "standard" CTD data.

Future developments include the development of a DBMS for a web based access to the in situ data and SSS match ups from the satellite as well as the back up data to evaluate the appropriateness of the comparison. A year-long test of the entire system will commence in May 2009, lasting until the real satellite data stream begins in May 2010 after launch.

4. Real Time Data Management

4.1. GTS status (Ann Tran and Mark Ignazewski)

In 2007, Argo floats transmitted more than 90000 TESAC messages on the GTS. 90% of the profiles transmitted on the GTS are within 24 hours of the float report. The TESAC messages are from the following GTS nodes: Washington and Landover, Toulouse, Tokyo, Ottawa, Melbourne, Seoul, and Exeter. There are some minor problems in TESAC messages such as missing salinity and/or temperature, positions are not correctly encoded, and depths are not increasing. The discrepancies in observation date and time in TESAC and the NetCDF file were found for KMA, INCOIS data centers. The time differences ranged from 9 – 12 hours. The problem of Argo TESAC duplicates on GTS is still present for BODC data center. All data centers converted pressure to depth before sending TESAC message on GTS.

As Anh Tran's report covered all the issues that Mark was going to discuss, he simply made the following notes:

- The KMA time differences are all exactly 9 hours (GTS times are later)
- The INCOIS time offset is always large, but is variable between 10-14 hours (GTS times are later)
- All of the GTS insertions now have "////" encoded for missing salinities (though Anh noted that one DAC was failing to put the proper group identifier with the group)
- AOML profiles with 900+ levels are being thinned below 300m for the GTS; only ~500 levels are on the GTS - full depth, just skipping every other level. This is limitation imposed by the TESAC message and it being handled properly by AOML.

During discussions regarding the observation times, it was discovered that DACs are using different ways of assigning the positions and times of the profiles; time of first block/first good position versus time of end of ascent/Argos location, etc. The DACs were asked to document how each DAC is doing this and, if possible, to arrive at a common technique.

AOML is processing iridium floats which are transmitting more points than the one allowed in TESAC message. The maximum number of p/t/s triplets is 829 for now (=15000 bytes). If the number of levels is more than 829, then they use sub-sampling method: they keep all the data points from the surface to 300 m and subsample every 2nd (3rd, or more) point to achieve a profile length of no more than 829 levels. The number of skipped points depends on the profiling depth and resolution. This decision to adopt this solution was made on 12-Jan-06.

4.2. Status of anomalies at GDAC

C Coatanoan presented the anomalies that are still detected when Argo profiles are submitted to GDAC. Objective analysis, performed at Coriolis, allows detection of those anomalies by comparison with climatology. Only few data have anomalies since an average of 6 profiles from 400 profiles submitted each day are detected. Some examples of anomalies were presented, mainly drift of salinity, first and last measurements on profile, bad data on part of the profile, salinity values of 0 that should not have gone through if the updated global range test for salinity endorsed at ADMT8 had been used.

A question has been asked about the threshold used for the test of gross salinity and temperature sensor drift. Should this threshold be changed to decrease the value or should we just wait for the OI test done at Coriolis to detect them. The second solution would be the best, but each DAC must pay attention to the quality control on their floats when problems are reported. Coriolis was asked to provide feedback in an ASCII file, providing enough information so that the DAC can automatically correct its profiles.

4.3. Feedback on test on upgrades of tests 8-9-11-14

C Schmid and C Coatanoan have tested the new version of these tests as defined at ADMT8. Some examples have been presented using proposed improvements at the last ADMT8, mainly iteration on tests defined in the action 29. Since it works for some cases and not for other cases, the conclusion is

that it could be 'dangerous' to update the tests with iteration. Using others complementary methods such as objective analysis, altimetry comparison seem better to improve quality control on data. Concerning the test 14, the use of sigma_0 instead of density should be done but not taking into account threshold proposed. The QC manual needs to be updated.

Overnight, B. King built a proposal to refine the Test 16 to detect jumps in salinity using delta in T and S on the deepest levels (700:2000) and assuming that jump occurs in S and not in T that it's likely to be bad salinity data. DeltaT was proposed to 0.5 and deltaS=0.15. Globally it seems to work. In some regions further tests are needed as T inversions go deeper. The Southern Ocean ARC contributors agreed to experiment with Brian's jump test. CSIRO will implement Brian's test on all their floats. UW will experiment with it for the Indian sector of the Southern Ocean. Results will be reported at ADMT-10.

5. Trajectory from Argo data

5.1. Feedback on Trajectory progress since ADMT8 (B King)

Brian King described progress towards preparing delayed-mode (DM) trajectory files. The plan is that a DM trajectory file will be produced for each float. This file will contain all the information supplied by the real time DACs in the traj.nc file, plus a significant amount of extra information either calculated by a DM process or pulled in from tech and meta files. The result should be a single file that contains all the information necessary for estimating subsurface and surface displacements, times and depths in a consistent manner, regardless of platform type, mission type or which DAC prepared the RT traj file.

At some stage in the future it may be possible to automate the process so that the 'DM' files are available in near real-time. Initially the process will need to be run in delayed mode by a central group, with significant checking by an operator who has detailed knowledge of the different platform types and mission choices.

Brian presented a proposal on the contents of new trajectory files containing extra information that are presently in tech or metafiles…The traj work will end up with a consistency check and recommendation to DACs. Brian shown what should be the delayed mode trajectory format, adding new variables from the different nc files with Error Status(transmitted or interpolated) and QC

The structure envisaged in B. King's presentation will need to be revised in response to some important additions in the RT traj file proposed by T.Carval, and in response to comments during Brian's presentation. B.King has worked with T.Carval to refine the format changes for RT traj files on Friday afternoon and a new version of the format was send by email to argo-dm people

B. King will revise the structure of DM traj files to reflect discussion at the meeting. (Ongoing, will continue to be revised as more test files are built for more platform types.)

After the meeting the following information was provided by T Kabayashi and Nakamura-san : JAMSTEC has prepared a document and of an idea of automatic QC method for Argo float positions on the sea surface on the PARC-JAMSTEC web-site : http://www.jamstec.go.jp/ARGORC/tools/JAM_RandD07_02.pdf. An execution file of the method is also available from "Tools & Link" page of PARC-JAMSTEC

5.2. Trajectory work done on Provor at Coriolis

S Pouliquen presented on behalf of M Ollitrault, JP Rannou et V Bernard the work done at Coriolis on the floats processed by the Coriolis DAC. This dataset represents about 800 floats, half of them being Provor and half Apex. The first step of this work has been to clean up the nc files (meta , traj, tech) in order to remove inconsistencies due to errors in meta files as they are filled manually, bad version used for decoding (bad information sent by Pis), anomalies in decoders especially for technical information,…

As the timing control of PROVOR missions is complex and a lot of information are provided in technical messages it's important to retrieve them and to make them accessible in timely fashion. Due

to a lack of recognition of what information was really required, and a lack of exploitation of the data to test whether information was being extracted completely and correctly, some important information for PROVORs were missing or faulty in the RT traj files while existing in the tech files. Lack of past examination of files by users meant little or no feedback to Coriolis to highlight and fix the problem. Now, a substantial new effort at IFREMER by Michel Ollitrault and Jean_Philippe Rannou to re-analyze the raw PROVOR messages has been of critical importance in assembling the necessary PROVOR data. Without this effort it would not be possible to prepare good DM trajectory files for PROVORs.

An important work has also been done on Apex floats by Ollitrault and Rannou , correcting the errors that have crept in due to the large number of different APEX data versions that have been used over the years. This challenge of evolving message structure is generic to all DACs with APEX floats. As new versions of APEX message transmission are released, DACs need to change their parsing software in response. It is easy for DACs to see when they have correctly extracted profiles. The correct extraction of technical parameters, used in DM trajectory processing, is less obvious when faulty, especially when there are few or no users processing the data to identify errors.

In addition as Provor is providing a lot of the time and parking information that are important to calculate velocity fields, Rannou and Ollitrault highlighted and corrected a number of errors in the recording of Parking Pressure. Similar anomalies were found on Apex floats. This is also critical for the correct assignment of float displacements to a parking depth.

Based on this work this have suggested changes in the format and checks at GDAC that were presented by T Carval just after.

It will be critical for the provision of high-quality trajectory data in the future that the expertise they have developed is retained and continues to be applied. Their experience should also be applied to QC of traj data held by other DACs and M Ollitrault is willing to work with the DACs that willing to do so.

5.3. Specification on format checker (T Carval)

In 2007-2008, Argo trajectories from Coriolis DAC were carefully scrutinized to produce a first version of an atlas of deep ocean currents called ANDRO (Argo New Displacements Rannou Ollitrault). To simplify and to streamline the calculation of deep ocean currents, the following changes were proposed:

- Revise the metadata file structure to include platform dependant metadata as well as record the different missions when metadata information can be changed during the life of a float (by iridium for example)
- Small but useful additions to Argo trajectory format were accepted and an update of the user manual was done;
- Simple but crucial tests of coherency between the different NetCDF files content that can be done at GDAC
  - Verify LAUCH_DATE/LAUNCH_POSITION by doing the speed test (> 3m/s) with the first cycle
  - Verify PARKING_PRESSURE using information in tech file : For Provor, use the average of PRES_ParkMinimum_dBAR and PRES_ParkMaximum_dBAR technical parameters. For Apex, use PRES_ParkMean_dBAR. If not available : compare with profile max pressure ?when available
  - DEEPEST_PRESSURE with mean deepest pressure from profiles
  - REPETITION_RATE: can be checked with cycle-times or deepest pressure using the CONFIGURATION_PARAMETER section
  - Parking time of measurements on Apex floats smaller than the cycle duration (JULD_DESCENT_START et JULD_ASCENT_END)

A proposal will be circulated at the end of the meeting by Thierry and approval before end 2008

6. GDAC status:

The US and French GDAC are stable and running smoothly.

6.1. Coriolis GDAC status

T Carval presented the status of the Coriolis GDAC and of the actions related to GDAC activities

- Since September 16th 2008 the GTS directory was removed from GDAC and hidden in the following directory: ftp://ftp.ifremer.fr/ifremer/argo/etc/gts/
  The GTS directory contains profiles from floats available from GTS only, without a DAC in charge of data-management. There are still 334 floats in the GTS directory. These floats should find a DAC and are monitored by AIC (Table 23 of the AIC monthly report). Most of them are from the US and transfer to AOML is ongoing..
- The mean salinity adjustment and its associated standard deviation are available in the profile index file : ftp://ftp.ifremer.fr/ifremer/argo/etc/argo_profile_detailled_index.txt.gz
- A file removal schema was proposed and accepted, the DACs will have the possibility to remove files from GDAC.
- A proposal to reorganize the latest_data directory of GDAC was accepted : files older than 3 months will be removed, the daily latest_data file will be split in 2 files : real-time and delayed-mode.
- To improve data transfer reliability, a numeric signature will be associated with each file of the GDAC (An MD5 numeric signature gives the possibility to check that a downloaded file is identical to the original).

6.2. US-GDAC status

The US Godae server, which hosts the US GDAC, is being moved from FNMOC to the Naval Research Laboratory – Monterey (NRL-MRY).

The benefits of this move are:

- Allow more flexibility in the development and deployment of new services than would have been possible within FNMOC.
- New hardware – faster and more reliable.
- Allow deployment of the enhanced format checker for the Argo files.

The primary impact of this move on the users is that all Internet (http and ftp) addresses referring to "fnmoc.navy.mil" will cease to function. Where possible, auto-redirects (with appropriate message) will be utilized.

The target date for this move is 3 December 2008. A down-time of 1 to 2 days is anticipated.

6.3. D-File checker status

The enhanced format checking will be available once the US GDAC move (see above) is completed. During December 2008, the checker will be available for DAC testing at the DAC "test" directory. Furthermore, the US GDAC will run batches of files through the checker and discuss the results with each DAC.

During January 2009, the enhanced format checker will be transitioned to the French GDAC and will go live late in the month. At this time, non-compliant files will be rejected at the GDAC. Note that if the rejected file was to replace a file already on the GDAC, the existing file will not be removed.

All existing files will be scanned and DACs will be encouraged to correct anomalies.

7. Format Issues

7.1. BUFFR format

The status of BUFR messages on the GTS was reviewed:

- AOML: BUFR message generation is working but has not been validated (see below).
- BODC: Sending BUFR files to the Met Office for validation.
- CLS (CSIO, INCOIS, KORDI): Will start distributing BUFR data in early 2009.
- Coriolis: Distributing BUFR message on their ftp server now. Coordinating with Meteo-France and expect GTS distribution soon.
- CSIRO: BUFR message generation is working. Will distribute on the GTS soon.
- JMA: Operational since 2007.
- KMA: Started distributing BUFR on GTS this week.
- MEDS: Their BUFR messages have been validated by their met office. Expect them to be distributed on the GTS soon.

Anh Tran volunteered to test-read BUFR files for any DAC that wants to send them to her. Several expressed interest.

Once they are on the GTS, MEDS and the US Navy (FNMOC and NAVO) will validate the GTS data.

It was noted that Kanno Yoshiaki is the ADMT representative to the JCOMMOPS Task Team.

7.2. Technical Files

Ann Thresher presented the work done in the past year on technical parameter names. The Technical names are now ready for use though some modifications might be required as DACs begin coding the changes. The naming conventions document is available through Coriolis, as is the list of names defined so far. These can be found at http://www.coriolis.eu.org/cdc/argo_rfc.htm

Review of progress so far:

- Name length 128 characters:
  TECHNICAL_PARAMETER_NAME(N_TECH_PARAM,STRING128)
- Value length 128 characters:
  TECHNICAL_PARAMETER_VALUE(N_TECH_PARAM,STRING128)
- All technical files will now have variable called ‘CYCLE_NUMBER’, with dimension ‘N_TECH_PARAM’: CYCLE_NUMBER(N_ TECH_PARAM)
- Cycle 0 to hold engineering and configuration data from test transmissions before first profile
- Cycle number to be as reported by the float, regardless of whether it’s spent 10 days below the surface.
- Names must be taken from the published table unless they are new. New names must be defined and added to the table as soon as possible
- New Units must be added to the technical units table as soon as possible.
- Naming convention follows the arrangement: What is measured – When/Where measured – Units
-

Further format rules can be found in the document http://www.coriolis.eu.org/cdc/argo/Technical_Naming_Convention_Rules.doc

Problems and misunderstandings:

- don’t confuse CURRENT (electrical measurement) with NOW (measurement of time),
- distinguish between CLOCK (decimal hours) and TIME (how long something lasted) and
- don’t use BOTTOM or DRIFT if you mean PROFILE or PARK.
- PRESSURE refers to an internal measurement – PRES is a parameter measured by the CTD

We have agreed that variables measured during Park phase of float belong in trajectory files but they can be repeated in technical files – duplication is not a problem.

The Surface pressure offset variable is REQUIRED if measured –

- PRESSURE_SurfaceOffsetTruncated**Plus5dba**r_dBAR (for all older APF8 floats, exactly as reported by the float)
- PRESSURE_SurfaceOffsetNotTruncated_dBAR (for all other floats including the new APF8 controllers which do not truncate surface pressure).

We decided that ALL technical information is useful and should be included. Even though this will make the files larger, it will mean that important information is not lost.

To help make the table more useful, we need all words used to be well defined – e.g., "immersion"? "ETF"? "ParkMargin"? "RTCStatus"? We need help from the DACs for this.

There is a section at the end of the table containing variables that do not yet have definitions. Again, we need help from the DACs to get these defined so they can be used.

As coding begins for these names, questions will arise. Ann Thresher will coordinate any new names being added to the table for now and we will decide who will have permanent responsibility for this after the initial coding is done.

We expect all files to be submitted using the new naming conventions as soon as possible, preferably by early in 2009 but this will depend on the DAC.

A reminder – the "Table of Technical Name Equivalents" table on the web: http://www.coriolis.eu.org/cdc/argo/table_of_technical_names_equivalents_draft_final_v2.xls will be the list to be used by all DACs and will be updated quickly as more names are properly defined.

7.3. Handling Iridium floats

The discussion revolved around the need for flexibility because of new sensors and non-standard missions.

The AST reminded the group that Argo has a primary mission of measuring pressure, temperature, and salinity globally and that, if other sensors threaten that mission, those floats will have to be removed from the Argo fleet. The AST chairs will be included in all discussions involving the deployment of new parameters.

A "velocity" parameter is being reported by some of MEDS floats and the appropriate variables will be added to allow distribution of this data.

7.4. Handling two or more sensors for one parameter

Thierry Carval reviewed the method for encoding a parameter from multiple sensors on a float. There was a consensus that the wording and examples are adequate.

7.5. Other needs

Some of the oxygen data was not being properly converted to micromole/kg. Taiyo Kobayashi will provide the correct equation for inclusion the users manual

There was discussion about the need for a "point of contact" entry in the meta-data file, in addition to the "PI". The consensus was that this change is *not needed.*

It was noted that many floats are nearing the "255 cycle rollover (back to zero)". Korea is already experiencing this problem. All DACs are asked to be certain they will not start overwriting earlier cycles when this occurs.

C Schmid pointed out that AOML was processing floats for Navocean that perform bounced profiles between two normal profiles. These profiles are not located as the floats don't surface. These floats are Argo equivalent and these bounced profiles can't presently be handled by the GDACs. For the time being, AOML should continue to provide the bounced profiles directly to the countries that

request them when they enter EEZ. An action is opened to study how to handle such float on GDACS.

In the "Trajectory" section of the meeting, Thierry Carval presented a proposal for format modifications to the meta-data and technical files. There was much discussion related to this topic at that time, as it related to the trajectory files, and in the "Technical" and "Pressure" sections. A unified proposal, taking into all of the comments, will be developed.

8. Delayed mode data management activities

8.1. Status of DMQC processing

Dean reported the status of the delayed mode profile processing end of September, before the last week rush due to ADMT meeting! While progress has been made and 59% of the profiles have been processed we are still not committing to ARGO policy specifying that delayed mode profile will be available within a year from acquisition. The effort must be continued and additional man power set up when progress are really to slow…

In the meantime regional analysis to check in near real time data set consistency are encouraged.

DAC	#DM >12 mo	#tot >12 mo	%
AOML	109186	178646	61
/SIO	42069	42345	99
/UW	45109	52776	86
/PMEL	17860	19352	92
/WHOI	2332	39657	6
BODC	4492	15738	29
CORIOLIS	30548	56387	54
CSIO	1609	1619	99
CSIRO	8566	11601	74
INCOIS	8720	13548	64
JMA	37672	57897	65
KMA	2056	5737	36
KORDI	0	6037	0
MEDS	12502	15748	79
TOTAL	215351	362957	59

8.2. Feedback from DMQC3

B King gave feedback from DMQC3 on actions where ADMT activities is needed. A complete report of the DMQC3 meeting is available at http://www.coriolis.eu.org/cdc/argo_rfc.htm

The OW methods described in the manuscript published in Deep-Sea Research "An improved calibration method for the drift of the conductivity on autonomous CTD profiling float by θ–S climatology" by Owens and Wong has been endorsed by ADMT to be used by DM operators within Argo

- CELLThermoMass correction computed by Greg Johnson assumes that ascent raise is constant which is not the case in high gradient area. DACs who haven't done anything stay like that until further results are done
- Ref DB : high priority to continue to populate especially in parse area…
- The ADMT endorsed the proposal made by DMQC group to used the OW methods described in the following manuscript for delayed mode processing ;
- RT DACs are recommended to carefully study and correct the anomalies detected in the RT data with the Altimetry-QC done at Coriolis-CLS by S Guinehut. And greylist the float when necessary.

Before starting DMQC, DM operators look at the real time flags and correct then when necessary before running the OW method. There is discussion between DM-operators whether or not these RT flags should be provided back to DACs by overwriting the automatic flags assigned in RT. This will be discussed on argo-dm-dm mailing list . The RT Dac operators recommend transfer of these corrected RT flags from DM operators to them to clean up the RT datasets.

Some floats are drifting to higher salinity which is not clearly understood and any PI who is able to recover such a float is encouraged to do it

8.3. How can altimetry be used to assess Argo quality

S Pouliquen presented on the behalf of Stéphanie Guinehut a scheme to search for offsets in Argo data using satellite altimetry measurements. The main idea is to compare co-located (in time and space) Sea Level Anomalies (SLA) from altimeter measurements and Dynamic Height Anomalies (DHA) calculated from in-situ T and S profiles to detect systematic errors in the Argo data set. Altimeter measurements are from the AVISO combined maps. Argo T/S profiles are from the Coriolis-GDAC. Dynamic height is calculated using a reference level at 900-m. The mean dynamic height used to calculate DHA is from a combination of WOA annual mean climatology and a contemporaneous Argo climatology. Systematic diagnosis is then carried out for each float time series. Comparison with mean statistics allows anomalous floats to be extracted. Anomalies can be due to sensor drift, calibration offset, measurement spikes, or other strange float behavior. So far errors are detected mainly in the real-time data set. Stephanie cautioned that for now, the method was not able to extract small errors in high variability regions and very small bias (~2-3 cm) in lower variability regions.

Anomalous floats detected by the altimetry qc are shown in the AIC Monthly Report. The list is also posted on a CORIOLIS ftp site together with a figure for each float at ftp://ftp.ifremer.fr/ifremer/argo/etc/argo-ast9-item13-AltimeterComparison.

DACs should check these anomalous floats together with their delayed-mode operators and PIs and provide appropriate adjustment if needed. All delayed-mode operators are urged to read the AIC Monthly Report to check for floats that are flagged by the altimetry qc and provide feedback to Stéphanie Guinehut.

S Pouliquen indicated that Coriolis plan to run this analysis with CLS on a quarterly basis.

RT DACs indicated that they needed the following additional information in the anomaly list :

- RT or DM data that are problematic
- the cycle number or cycle interval where there is a problem

After the meeting Stephanie agreed by email to provide these information for the run that will be performed in January 09

Stéphanie was also asked to checked that she was excluding the greylist profiles and flag 3-4 data . After the meeting she provided the following information : the greylist profiles are not excluded – since if they are in the grey list, they should have flag 3-4 data.With the method, we found one float present in the grey list but still having data travelling with flag 1 values – and distributed on the GTS. Flags 2-3-4 data are excluded.

RT-Dac and DM operators have to inform Stéphanie and AIC when they have corrected the data and resubmit their profile or if the data is correct. AIC will monitor in monthly report

AST will provide suggestion for improvement and especially suggestion to process floats by groups of floats and identify the doubtful groups. Stephanie agreed to work with AST on this issue in 2009.

8.4. Report of the pressure working group

A report was submitted by S. Wijffels and P. Barker on behalf of the AST's Pressure Working Group (PWG), summarizing the present status of the group's findings and its recommended actions. The PWG is presently focused on errors in the Argo dataset resulting from surface pressure drift in APEX floats, which comprise 61% of Argo floats. PROVOR and SOLO floats, comprising most of the remaining instruments, perform cycle-by-cycle resets of surface pressure, and report the magnitude of the drifts. Most APEX floats with APF-8 controllers provide measured surface pressure values, with 5 dbar added, only in those instances where the drift of surface pressure has positive sign (55% of Argo floats). For instruments having negative drift, the surface pressure is truncated to zero, with 5 dbar being the reported value (16% of Argo floats). In the remaining 8% of floats there were missing or inconsistent data, or other problems, that prevented the PWG from making its analysis.

The PWG identified two classes of problems. The first class is due to the lack of correction or to mistakes in correction of pressure drift by most DACS in both real-time and delayed-mode processing. In spite of the positive-drifting instruments being correctable, most have not been corrected and there are many cases of wrongly corrected data (e.g. mishandling of the 5 dbar offset). The PWG urges DACs to provide accurate and consistent data in their files, and to apply surface pressure corrections to all instruments, in both real-time and delayed-mode processing.

The second (and uncorrectable) class of problems is due to the truncated negative pressure drift (TNPD) instruments. The PWG will provide a list of WMO IDs of these instruments (and of the other cohorts it has identified) so that users may exclude such instruments or not from their analyses, as appropriate. Further, it is known from studies with APEX instruments having APF-9 controllers (reporting both positive and negative surface pressure drift) that most negatively drifting Druck pressure sensors have very small drift (< 1 dbar). A few percent have much larger negative drift (tens of dbars) due to an internal problem (microleaks) in the sensor. It is believed that instruments with TNPD greater than about 10 dbar can be identified using Altimetric QC methods, and that once these instruments are identified and greylisted the remainder of the TNPD instruments will be usable for most applications. The PWG will make an assessment of the bias impacts on the Argo dataset of the problems it has identified.

Actions agreed at ADMT-9 following report from Wijffels & Barker regarding correcting pressure errors in APEX floats

1. All DACs agreed to record SURFACE PRESSURE in the tech files with either the variable name "PRES_SurfaceOffsetTruncatedPlus5dbar_dBAR"or "PRES_SurfaceOffsetNotTruncated_dBAR", depending on the type of controller used.
2. All DACs agreed to clean up their tech, profile, and trajectory files so that the cycles match, and to fill in FLOAT TYPES, SENSOR TYPES, PROJECT NAMES, LAUNCH DATE.
3. All DACs agreed to carry out real-time pressure adjustment in 'A' mode to all APEX floats. The real-time adjusted values will be recorded in the variable PRES_ADJUSTED. The raw

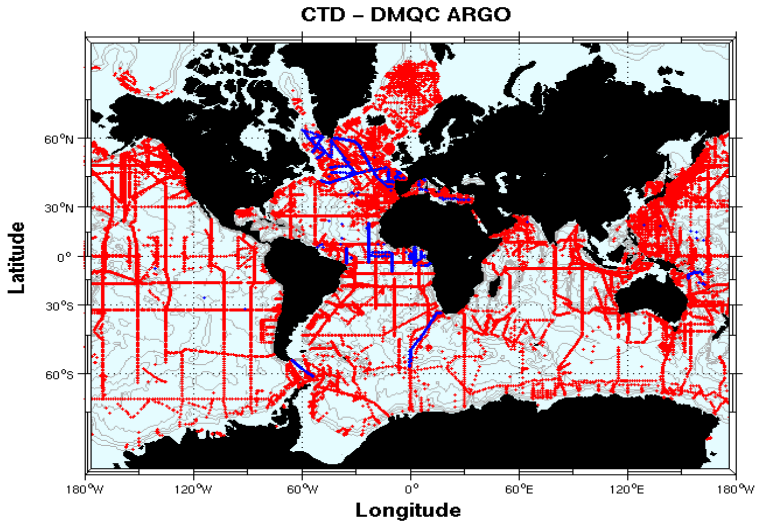
values will remain in the variable PRES. Annie Wong will lay out the details of the APEX floats real-time pressure adjustment procedure in the Argo QC Manual.

4. APEX groups with Apf-9 and the new non-negative-truncating Apf-8 controllers (that is, APEX floats that report negative surface pressure offsets) will monitor their floats for the oil microleak problem in Druck sensors, which exhibits itself with increasingly negative surface pressure offsets. These floats will go to the greylist if the pressure offset exceeds 20 dbar.
5. For APEX floats with the old negative-truncatingApf-8 controllers (that is, APEX floats that do not report negative surface pressure offsets), Annie Wong suggested 5 features to look for that may reveal negative surface pressure offsets.
   i. The reported values of SURFACE PRESSURE will be uniformly zero (after the artificial +5dbar is removed).
   ii. Stephanie's altimetry qc will show DHA significantly lower than SLA.
   iii. Cold temperature anomalies will be evident at depths below 1000dbar.
   iv. For floats that have remained in the same water mass regime, isotherm depths will shoal.
   v. For floats that have not experienced conductivity sensor drift, salinity will drift salty.
6. For delayed-mode pressure adjustment for APEX floats, Annie Wong will finalize a consistent method with Wijffels & Barker and communicate the result to all delayed-mode operators via argo-dm-dm@jcommops.org.

9. Reference database progress

9.1. Summary of the actions since ADMT-8

Since the last ADMT8, a version of the reference CTD dataset was provided at the end of July. This first version has been built from the release WOD2005 of the NODC. Data older than 1990 have not been into account; efforts should be focused on the recent CTD datasets. Following the recommendation of the DMQC-3 workshop, a second version removing the conversion of the temperature (ITS90 to ITS68) was released in October. A few recent CTD have been added to this version.



In Red WOD05 since 1990 and in blue the recent CTD provided by ARCs

Datasets are available on the Ifremer ftp site. Since this is a restricted access, users need to ask for a login/password at codac@ifremer.fr. The reference Argo dataset, built by John Gilson, is also available on the ftp site.

Recent CTD coming from ARCs and PIs should be sent directly to CCHDO which will perform quality control, remove duplicates and provide to the Coriolis data center with a dataset in a fixed format.

9.2. CCHDO's Contributions to the Argo QC database: Past, Present and Future

S Diggs presented the progress of the CCHDO contributions to Argo's DMQC database. In addition, he gave a brief summary of the progress of the cooperative efforts between US-NODC and CCHDO to increase the sheer number of CTD profiles in the DMQC database.

After reminding the group of what the CCHDO's primary responsibilities are (high quality global hydrography delivered in a consistent manner), we discussed a brief history of the relationship between CCHDO and Argo. Over the past two years, a number of strategies have been employed to get recent high-quality CTD profiles from various international sources, some more successful than others.

In general, trying to get all CTD profiles from every source was less than successful, although the CCHDO and Coriolis did manage to get one set of CTD data (from PIRATA) into the DMQC. Recently, we have refined our data search strategy to focus on very recent cruises in the Southern Ocean. These efforts have resulted in acquiring five (5) sets of cruise/CTD data that were completed in the last 24 months. These cruise data have been made available to US-NODC and Coriolis. In addition, the CCHDO will be the data manager for hydrographic data for the DIMES program and other, non-related cruises (US, UK) plan on making their CTD data available within weeks of cruise completion

CCHDO and US-NODC will work together to extract from the quarterly WOD updates the CTD post calibrated, deeper than 1000m that are relevant for reference DB activity. These data will be provided to Coriolis by CCHDO.

Finally, CCHDO and the AIC will work together on a coordinated strategy for discerning where there may be CTD observations at Argo float deployment locations.

Looking forward, the group approved the Southern Ocean strategy, and pledged to help find new hydrographic cruises for inclusion in the Argo Reference Database. We plan on including at least 7-10 CTD cruises next year.

10. Feedback from ARC meeting

The second ARC workshop was held just prior to the ADMT meeting. Jim Potemra and Claudia Schmid organized and chaired the workshop. A separate report will be available soon. For the information of the ADMT attendees, Jim and Claudia provided a synopsis of the workshop.

The utility of ARCs was discussed, and there was general agreement that ARCs are worthwhile.. The "essential" and "optional" tasks of regional centers were reviewed, and it was agreed that these are still appropriate. Perhaps one recommendation would be for each ARC to specify:

a) who is responsible for each item

b) what resources are required,

c) a timeline and/or plan for the actions

Steve Diggs discussed the CCHDO CTD program and stressed the need for communication those organizing cruises and his program that will archive CTD data. ARCs should work more as brokers for this.

In all DACs there are activities going on regional QC that have showed that some progress. A large part of the discussion focused on how to merge results from different ARCs on the same float and how to report them to the DM operator. It was agreed that for the time being, while we are in a developing mode, suspicious data will be reported through AIC and that next year will be early enough to revisit this issue on the tools that will be operated on a regular basis…

There have been a lot of discussions about Argo products and product development and the separation between products, viewers, tools….? A catalog of gridded products described in an homogeneous way is under construction by Megan. Interesting tools should be made available through AIC

Deployment planning was discussed, with the focus on how to get information on opportunities and how to distribute the information. AIC is working on this within JCOMMOPS.

The communication with PIs (or lack thereof) remains a concern to provide feedback on data quality at basin scale and it was highlighted that dialog with DMQC operators, maybe via a joined Arc DMQC meeting prior to ADMT, would be useful.

The resources continue to be a hurdle, both in terms of personnel and funding.

11. GADR activities

Charles Sun reported the highlights of the Global Argo Data Repository (GADR) activities since the eighth Argo Data Management Meeting at the Marine and Atmospheric Research of the Commonwealth Scientific and Industrial Research Organization (CSIRO) of Australia in Hobart, Australia from 14 to 16 November 2007. The primary functions of the GADR are: to 1) archive profiles, metadata, trajectory and technical information received from the GDAC on a monthly basis, 2) provide tools to allow transformation of Argo netCDF data into other forms and 3) provide usage statistics, data system monitoring information and problem reporting facility. He reported that the GADR performs an automated procedure of "mirroring" a local Argo data set in sync with the Argo GDAC server at Monterey, CA. The automated "mirroring" script runs daily from 0:00 to about 5:00AM UTC. He suggested that the Argo GDAC at Monterey not update files during this time frame to allow for the "mirroring" procedure to complete. ADMT prefers that US-GDAC continue to be updated during this period.

The GADR received an average of 1,010,865 requests per month in the period from October 2007 to September 2008, increased from 455,909 requests per month last year over the same period of time, while the monthly-averaged Argo data downloaded increased from 17.85GB in 2007 to 39.17GB, about 119% increase, this year.

US-NODC tested providing monthly images of the ARGO dataset. This product is judged useful and it was recommended to be generated on a one year sling window.

No anomalies were found this year in ARGO data.

C Sun also reported the work done by T Boyer of quarterly WOD updates with preliminary QC. It was recommended to document this preliminary QC procedure and to work with CCHDO to extract from this dataset the CTD useful for the Reference DB.

C Sun informed the group that the GTSPP NetCDF data format will change to be compatible with ARGO in terms of variable names. There is a suggestion to work on moving ARGO format to be CF compliant by adding the appropriate attributes. A study will be conducted by Charles and Thierry this year.

12. Other topics

The action list was compiled, is available in annex4, and was approved by participants. Dean pointed out that it's important to deliver according to accepted deadlines and that some action on the dataset quality can't wait another year. Megan will help the chairs to monitor the action status progress.

ADMT10 will be hosted by JCOMMOPS and CLS in Toulouse . There is already an offer from Germany to host ADMT11 at BSH/Hamburg.

13. ANNEX 1 Agenda

Objectives of the meeting

- *Review the actions decided at the 8 th ADMT meeting to improve Real-Time data flow (considering all aspects of the system from transmission from the float to arrival at GDAC and accessibility of data by users)*
- *Review status of Delayed-Mode quality control and Progress to reduce backlog*
- *Review the metrics regarding Argo program to document future (and if possible past) growth and performance of:-*
  - *the Argo array*
  - *the Argo data system (performance indicators, problem reporting)*
  - *the uses being made of Argo RT and DM data (user monitoring)*
- *Feedback from the Regional Argo Data Centre meeting*

Schedule: *Meeting will start at 9am and finish around 1730 on Wednesday and Thursday. We plan to finish around 1400 on Friday.*

The meeting will be opened by Pr Mark Merrifield from the Ocean Department and Director of the University of Hawaii Sea Level Center.

Feedback from 9th AST meeting : (30mn) Dean Roemmich

Status of Argo Program and link with Users (1h 30)

The Argo Technical Coordinator will report on the status of the Argo program and on the development of the Argo Information Centre. The implementation of metrics to monitor the performance of the data system will be discussed. First feedback on the user forum will be presented.
Status on the actions 1,2,3,4,5,6,7,8,9,10

- ***Review of the Action from last ADMT*** *(S Pouliquen)*
- ***Argo Status ,Development of the AIC*** *(M Belbéoch)*
- ***Aquarius and Argo: (J Gunn)*** *(20mn)*

Real Time Data Management (2h00)

Review the Argo real time data stream, the status of actions from ADMT-8 and identify new actions needed to improve the volume, timeliness of delivery and quality and ease of Argo RT data.
Status on the actions :24,25,26,27,28,29,30,31,32

- **Real-time availability**: 15mn (M Belbeoch)
  - Argo floats only available on GTS and not at GDAC
  - Historical Dataset action 24
- **GTS status**: 30mn
  - Timeliness of data delivery: Review evidence provided by the MEDS statistics on the timeliness of data delivery via GTS. (A Tran)
  - Status GTS problems – Action 25-32(M Ignaszewski)
- **Status of anomalies at GDAC** (C Coatanoan) 20mn
- **Feedback on test on upgrades of tests 8-9-11-14** (C Schmid, Ann Gronell, C Coatanoan) - Action 29 : 30mn

Trajectory from Argo data (1h30)

Status on the actions ,11,12,13,14

- **Feedback on Trajectory progress since ADMT8** (B King)
- **Trajectory work done on Provor at Coriolis** (S Pouliquen,T Carval)
- **Specification on format checker (** T Carval)

GDAC Services (1h30)

What's new at GDACs and Improve services for users.
Status on the actions : 15,16,17,18,19,20,21,22,23

- **What's new at Coriolis and US GDACs** (T Carval, M Ignaszewski)
- **Status of GDAC synchronization improvements** (Mark Ignaszewski)
- **Status of Format Checking enhancements (D-Files checking)** (Mark Ignaszewski)
- **New needs?**

Format issues (2H00)

While format is pretty well standardized for measurements and qc flags, experience at GDACS shows that there are discrepancies both at metadata and technical and history levels that ought to be resolved to the benefit of the community. A lot of discussions occurred by email during the year but decisions need to be taken.
Status on the actions : 41,42,43,44,45,46

- **BUFR Format** : Status on the experimentation phase (ALL)
- **Technical Files** Action 41-42 (A Tresher)
- **Handling Iridium floats** (C Schmid?)
- **Encoding a parameter from multiple sensors on a float (T Carval?)**
- **Other needs ?**

Delayed mode data management (2h00)

Status on the actions 33,34,35,36,37

- **Review backlog of DMQC** (Dean or Megan)
- **Feedback from DMQC-3 Workshop** (Brian and Annie)
- **How can altimetry be used to assess Argo quality** (S Guinehut)
- **Report of the pressure working group** (Susan Wijffels)
- **Discussions**
- **Updates to the Argo QC Manual** (Annie)

Progress on Argo Reference data base (1h00)

Status on the actions 38,39,40

- **Summary of the actions since ADMT-8** (C Coatanoan)
- **CCHDO-NODC progress** (S Diggs , T Boyer)
- **Discussion on improvement requested**

RDACs: provide an information on what done and what is planned (1h30)

- **Feedback from the ARC meeting and Endorsement of the actions proposed** (J Potemra & C Schimd)

GADR (1h00)

Status on the action 49

- **Status of the Archiving centre** (C Sun)

2. **Other topics (1h00)**
   - **Summary of the 9th ADMT actions** (S Pouliquen M Ignaszewski) 30mn
   - **Location of 10th ADMT**

14. Annexe2 Attendant List

Name	Organization	Country	Email
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15. Annex3 ADMT8 Action List

	Action	Target Date	Responsibility	Status
	Monitoring Actions			
1	Provide access to the support@argo.net question/answer database to the AST and ADMT chairs	AST9	AIC	Done http://support.argo.net
2	Establish an Argo user mailing list and a subscription form for Argo to notify users rapidly	End 2007	AIC	Created argo-du@jcommops.org
3	Provide to AST chairs the list of operators that notify with delay their floats	End 2007	AIC	Done See AIC report
4	Include in AIC report the suspicious floats/profile detected by John Gilson monitoring tools	AST9	AIC John Gilson	cancelled
8	Modify the text attached to support@argo.net to encourage people to use this email to report on data quality	End 2007	AIC	Done
9	Promote support email on GDAC ARC DAC and GADR and other national WWW	End 2007		Done at Coriolis
10	Argo forum to be set up by AIC	AST9	AIC T Tchen	Started
	Trajectory Actions			
11	Brian to provide guideline on how to correct Ascent and Descent Time for APEX and SOLO floats	End 2007	Brian King	Not done
12	Thierry to provide similar guidelines for Provor	End 2007	Thierry Carval	A proposal will be submitted at ADMT9
13	Each DAC to correct its trajectory file according to these guidelines	ASAP	All DACS	On going At Coriolis To be done at INCOIS and KMA
14	Set up format check on trajectory files	ADMT9	Brian King and Mark Ignaszewski	Not Started
	GDAC Actions			
15	GDAC to work with Kordi to establish data transfer from the Kordi DAC	End 2007	Kordi Loic Petit de La Villéon & Mark Ignaszewski	Completed

16	Hide the GTS directory from the Argo DAC directory and provide a specific index for AIC monitoring	End 2007	Thierry Carval & Mark Ignaszewski	Directory Hidden Index file to set up
17	Add a new column "Adjustment" providing the D and A file adjustment and "missing" for RT (mean of PSAL_Adjusted-PSAl on the deepest 500 meters)	AST9	Thierry Carval & Mark Ignaszewski	Made available at Coriolis GDAC on 24th October 08
18	Automate file removal between the two GDACs	ADMT9	Thierry carval & Mark Ignaszewski	Specification started a proposal will be presented at ADMT9
19	Remove history section from the files in the Latest Data directory. Notify users before !	ASAP	Thierry Carval & Mark Ignaszewski	Under development
20	Study the capability to separate in the latest data directory the new data from the updated ones	ADMT9	Thierry Carval & Mark Ignaszewski	Specification started a proposal will be presented at ADMT9
21	Advertise that at present O2 data are not QCed	End 2007	Thierry Carval & Mark Ignaszewski	Done
22	Improve File checker for realtime and delayed mode profiles checking not only the format but also the consistency of the data and transfer to Coriolis	For Test Jan-Feb 2008 Start operational March 2008	Mark Ignaszewski DACs to eventually correct their files	Dev finished . Awaiting for deployment on new US GDAC servers
23	Set up the automated greylist submission	AST9	Mark Ignaszewski	Dev finished . Awaiting for deployment on new US GDAC servers
	Real-time QC Actions			
24	Take action to process from raw data the historical floats only available via the GTS directory (table 11 & 12 from AIC report)	ASAP	Mainly AOML for USA Argo equivalent floats Remaining floats from Jamstec, Canada, India	Done for JAMSTEC floats On progress for AOML with NAVO floats
25	KMA to work with MEDS to understand why MEDS doesn't see any KMA TESSAC messages since March 2007	End 2007	Ann Tran and KMA	Corrected Dec 07
26	CLS to check why the pressure problem has reappeared	End 2007	Yann Bernard	Corrected Nov 07

27	When salinity is missing for a level, DACs were requested report the z, T, S triplet with S set to "////" rather than completely excluding the level		KMA Coriolis CLS	Done at CLS and Coriolis and KMA
28	On GTS , in TESAC message Japan, Australia and Korea to check why occasionally the depth is not increasing;	AST9	JMA KMA	Done at JMA and KMA
29	Test the proposed upgrades of tests 8-9-11-14 propose in Christine report	March 2008	AOML Coriolis CSIRO	AOML will report on tests
30	Update test 6 if the float transmits conductivity set PSAL_QC=4 if TEMP_QC=4	ASAP	All DACs	Done at CSIRO INCOIS have no such floats Done at JMA, KMA
31	Update the QC manual	End 2007	Thierry Carval	Done 21st January 08
32	Investigate the 12 hour offset on Incois data on GTS	ASAP	Incois CLS	Done at INCOIS
	Delayed-Mode QC Actions			
33	Reduce backlog of Delayed Mode file to less than 20%	ADMT9	All DM operators	On progress but only 59% target reached. Man Power is a real issue!!!
34	Make available the Plots related to DMQC for each float on FTP organized by WMO number	AST9	All DM operators	Jamstec: Plots available on own WWW
35	Program a 3rd DMQC workshop	Sept 2008	Brian King and Annie Wong	Done
36	Provide an enhance version of OW software	Feb 2008	Annie Wong	Done
37	Update the QC manual to inform DM operators that they can revisit de RT QC flags if they find errors and modify them	End 2007	Annie Wong	Done 21st January 08
	Reference Dataset Actions			
38	Provide the first version of the Argo Ref DB Argo2008-01	March 2008	Christine Coatanoan	ARGO2008V01 was issued on the 31st July 08
39	Propose and update procedure for the new CTD coming from ARC, CCHDO and NODC	ADMT9	Christine Coatanoan, Steve Diggs and Tim Boyer	Proposal will be discussed at ADMT9

40	ARC to send the collected CTD to CCHDO either as public or private access data	AST9	All ARCs	Started JAMSTEC sent to NODC CTD older than 1year INCOIS sent CTD to Coriolis and NODC AOML sent CTD to NODC .
	Format Actions			
41	All Dacs to prepare for GTS distribution in BUFR using if they want JMA converter	ASAP	All DACs except JMA who has already started	Dev done at Coriolis waiting for Meteo-France agreement to start a test Dev Done at AOML Under testing at KMA
42	Circulate the list of technical parameters so that the DAC can see if they have corresponding parameters for what they do at present. This list will be posted at ADMT WWW site.	AST9	Ann Gronell and Claudia Schmid	First version Done Updates needed while people implement
43	Propose an update procedure for the list of technical parameters when a new one is needed	ADMT9	Ann Gronell	To be formalized at ADMT9
44	Modify the User manual to take the new technical file format into account.	End 2007	Thierry Carval and Ann Gronell	Manual have been modified To be approved at ADMT9
45	DOXY measurement : fill properly the metadata : Sensor=DOXY or TEMP_DOXY , Sensor-Maker="Aanderaa" or " SEA-BIRD ELECTRONICS, INC." " Sensor-Model= "Oxygen Optode 3830" or "Oxygen SBE43F"	ASAP	ALL DACs processing DOXY	Done at CSIRO an INCOIS Done at JMA Partially done at AOML
46	DAC to update their technical files according to new specification	ADMT9	All DACs	Specification started at Coriolis Ready to go at CSIRO waiting for file checker update Idem INCOIS To be done at KMA

47	Update the file checker and provide access through test directory on US-GDAC	ADMT9	Mark Ignaszewski	
48	Reword the description of float cycle in the user manual	AST9	Thierry Carval and Ann Gronell and DACs	A proposal will be presented at ADMT9
	GADR			
49	Provide the list of float with problems on GTS to AIC on a monthly basis to be included in the monthly report	ASAP	Charles Sun and AIC	Done

16. Annex 4 ADMT9 Action List

	Action	Target Date	Responsibility	Status
	Monitoring Actions			
1	Calculate time delay for getting R-files and D-Files onto the GDAC. Investigate files slowly arriving.	Early 2009	GDACs and AIC	
2	DACs to verify they are prepared for cycle > 255	ASAP	DACs	
3	Monitoring the floats sending good data to be included in AIC report	AST10	AIC	
4	Promote the email support@argo.net on ARC GDAC DACs WWW sites	AST10	ALL	
	Trajectory Actions			
5	Coriolis to check the GDAC files according to the consistency test agreed to warn DACS of anomalies in their data	End 2008	Thierry Carval	
6	DAC to clean up their files according to the warning issued in previous action	AST10	All DACs potentially	
7	Revise the RT traj file description	End Nov 2008	Thierry Carval and Brian King	
	GDAC Actions			
8	Coriolis (And US-GODAE?) to investigate why multi-profile files are not processed for Kordi Floats	15 November	T Carval (& M Ignaszewski ?)	
9	Coriolis (& Us-GDAC?) to investigate why the list of floats mentioned in AIC report have disappeared	15 November	T Carval (&M Ignaszewski?)	
10	Automate file removal according to the agreed procedure	AST10	GDACs	
11	Modify the "latest data" directory to handle a sliding of 3 months and separate R and D data.	AST10	GDACs	
12	Implement an MD5 signature to secure file transfer and document it	ADMT10	GDACs	
13	US-GDAC to automate grey list submission	End 2008	M Ignaszewski	

14	DFILE checker to be tested in December with DACs and then transferred to Coriolis GDAC	AST10	M Ignaszewski	
15	GDAC D-files holding to be checked and anomalies provided to DAC and DM operators	January 2009	M Ignaszewski	
16	Document Grey list submission	End 2008	T Carval	
	Real-time Actions			
17	KMA, INCOIS and JMA to investigate why there is time difference of a few hours between profile on GTS and at GDAC	ASAP	KMA, INCOIS, JMA	
18	BODC to revisit the issue of stopping sending duplicates on GTS	ASAP	Lesley Rickards	
19	Coriolis to provide feedback on anomalies detected by statistical analysis in text files	AST10	T Carval & C Coatanoan	
20	DAC to correct their flags according to Coriolis recommendation and resubmit them	ASAP	All Dacs	
21	Coriolis and AIC to monitor the resubmission of profiles after feedback	ASAP	AIC and Coriolis	
22	QC manual to be updating to specify sigma0 in the density test	15 November 2008	C Schmid T Carval	
23	New proposal made by B King of Jump test to be tested	AST10	UW, CSIRO, BODC and all voluntary DACs	
24	Develop a common method for determining the positions and observation times at DACs	ADMT10	DACs. Lead by Ann Thresher	
25	DACs to verify their Salinity gross range check with minimum value of 2 PSU	ASAP	DACs	
26	Susan to provide the list of WMO where problem have been detected in Surface-Pressure offset(in tech file) or in meta file and document it on AST WWW site	15 November 2008	S Wijffels	
27	DACs to provide timetable on when they will have corrected their files	1st January 2009	All DACS	
28	Clean the tech file for surface-pressure in tech files	AST10	DACs	
29	Do not confuse SURFACE PRESSURE with the shallowest measured pressure in the vertical profile.	ASAP	INCOIS	

30	PRES should record *raw data*. All adjusted pressures go to PRES_ADJUSTED in 'A' mode for real-time DACs.	ASAP	JMA	
31	DACs to implement RT pressure correction according to specification in the new version of the QC manual on incoming data.	AST10	DACS	
32	DACs to implement RT pressure correction according to specification in the new version of the QC manual for the old R-Files	AST10	DACS	
	Delayed-Mode QC Actions			
33	ADMT chairs to indicate in report the endorsement of OW method by ADMT for DMQC	15 November	Chairs	
34	DACs to look carefully at the report of Altimetry-QC as a lot of anomalies occurs in RT data and to correct their files and report to Stéphanie and Mathieu	Every 3 months when a new list is provided	All DACs	
35	Stéphanie to modify her list of suspicious floats by indicating id suspicious data are RT or DM data, the Cycle or Cycle interval that has problem. Verify if grey-listed float/cycles are excluded from the list	Next run	S Guinehut	
36	Annie to finalize DM pressure adjustment procedure to Apex float with Susan and barker and communicate the results to the DM group	Feb 2009	A Wong	
37	Modify QC manual	15 November 2008	A Wong	
	Reference Dataset Actions			
38	CCHDO to collect CTD in sparse area in the REF DB and especially Southern Ocean	ASAP	S Diggs	
39	CCHDO to extract from WOD updates the post-calibrated CTD deeper than 1000m and provide them to Coriolis	AST10	S Diggs and T Boyer	
40	ARCS and AIC to help CCHDO by providing point of contacts when they are aware of CTD cruises interesting for Reference database		Arc and AIC	
41	CCHDO to provide the list of cruises he is working on to ADMT	ASAP	S Diggs	
42	Coriolis to update the Reference database twice a year	AST10 and ADMT10	C Coatanoan	

	Format Actions			
43	All DACs to transmit their BUFR file to Ann to be checked	ASAP	Anh Tran	
44	JMA and Jcommops to represent Argo and the BUFR JCOMM task team		Y Kanno, AIC	
45	Ann Thresher to finalize the first version of technical file names for ARGO floats	Mid-November	Ann Thresher	
46	DACs to updates their tech files	AST10	All DACs	
47	Update user manual to put the conversion equation for Oxygen measurement	15 November	T.Kobayashi C Schmid and T Carval	
48	Identify format upgrades to be CF compliant	ADMT10	T Carval & C Sun	
49	Validate BUFR files on GTS	July 2009	A Tran, Navy (NAVO and/or FNMOC)	
50	Revise meta-file format taking into account the configuration data	End Nov 2008	Thierry,Claudia & argo-dm-format	
51	Resubmit meta-files	ASAP	All DACs lead GDACs	
52	Revise the user manual on meta and tech files	End Nov 2008	T Carval & Claudia Schmid	
53	Study the delivery of bounced profiles	ADMT10	T Carval & Claudia Schmid and format mailing list	
	GADR			
54	Move to operational the monthly image of the Argo dataset on a sliding one year window	End 2008	C Sun	
55	Document the Preliminary QC procedure on WOD updates	ASAP	T Boyer	

17. Annex5 National Reports