8th ARGO DATA MANAGEMENT MEETING

Hobart
14th - 16th November 2007

Version 1.2
15th December 2007

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1. Objectives of the meeting

The 8th ADMT meeting was hosted by CSIRO, Hobart, Australia. The meeting was opened by Dr Gary Meyers, Director of the Integrated Marine Observing System (IMOS) division of the Australian National Collaborative Research Infrastructure Strategy. Dr Gary Meyers said that it was a pleasure for Australia to host this ADMT meeting especially with the 3000 Argo floats event to celebrate. He pointed out that Argo is an important component of the observing system but also complementary to the XBT repetitive lines that he has been involved in before and other observing system such as gliders or coastal radar . Dr Gary Meyers is the head of the IMOS program which funds the Australian Observing system infrastructure, in the ratio 1/3 climate 2/3 coastal, that includes an Argo Australian contribution of 50 floats per year until 2011. This will allow measurement of the impacts of coastal processes on the open ocean. Plans are to maintain a sustained observing system for the future.

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

- Review the actions decided at the 7 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

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

2. Feedback from 8th AST meeting (Dean Roemmich)

Dean Roemmich presented the topics discussed at the last AST meeting that were related to ADMT activities, noting those considered most pressing from the AST point of view. Argo is going to a new "sustained maintenance" phase during which it will be essential to demonstrate the high value of Argo in operational and research applications. The value of Argo will depend strongly on the quality and availability of real-time and delayed mode datasets, and efforts should be aimed at improving these in a timely manner. At present, the implementation of the Argo program including its open data policy and its data management system is being recognized internationally as a major success. Users and participants alike view Argo's achievements favorably. Operational users were polled prior to the AST-8 meeting and reported they are overall satisfied by the quality and timeliness of the Argo data. The present view of Argo as a success creates a favorable climate for further improvement of the program.
The AST views the following as highest priority issues:

1. Timely recognition of systematic errors in real-time datasets. The Argo dataset is sufficient to begin estimation of mean and variance fields on a global basis. These will permit statistical tests to be carried out to identify unusual or suspicious data for further examination.
2. Elimination of the backlog in delayed mode processing. Presently, only about 60% of profiles older than 12 months have been processed to "D" files. It is very important to increase this percentage to 90% or greater in 2008.

3. Learn how to use selected Argo data for adjustment of the salinity (in parallel with the reference dataset of high quality shipboard CTD data). Some guidelines have been proposed by John Gilson for selection of "best" Argo data. These will be tested and modified by a small group prior to the next AST meeting. To check on the accuracy of this Argo reference dataset, identification is needed of high quality CTD data that are near in space and time to Argo profiles from floats not more than about a year old.

Dean encourages Argo participants to be imaginative in solving these issues. As an example, he showed work by Josh Willis using satellite altimetry to detect the pressure errors on WHOI floats.

3. Status of Argo Program and link with Users

3.1. Review of the Action from last ADMT (S Pouliquen)

Sylvie Pouliquen reviewed the action list from last ADMT and pointed out that the situation is much better than last year and a lot of the actions has 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.

3.2. Argo Status and AIC development (M Belbéoch)

The Argo Technical coordinator reported on the status of the Argo programme and on the development of the Argo Information Centre. He informed ADMT that China, India, and Germany were presently also supporting the AIC.

In 2007 progress was made on the following issues:

- Improve Argo implementation monitoring and planning
- Improve Argo Data distribution monitoring
- Improve monthly reporting to PIs/ program Managers, float operators and data managers
- Upgrade the JCOMMOPS Information System (new server) to its final configuration
- Finalization of the new AIC website

The "float of the month" news section was presented. It is managed by Megan and Argo members are welcome to provide her with contributions.

To that end, new products (maps, stats, GIS data layers,...) were developed. TC particularly insisted on the Argo deployment planning organization and notification. This core function of the AIC was reviewed, improved, and documented. TC recalled that some progress was made by float operators but that some additional efforts were required to notify the deployment plans in advance. He recalled that the ARCs that were coordinating deployments plans in their basin should use the information centralized at the AIC on the planning.

TC presented the support centre and invited all Argo websites to promote the generic address support@argo.net. Megan and TC receive the requests and the queries are recorded and, if necessary, forwarded to the appropriate person either in AST or ADMT. When the answer is provided by another person TC must be copied of the answer that he will then register in the database that will be accessible at least to the AST and ADMT chairs…

The ADMT noted that the AIC monthly report was very useful and invited data managers to provide more feedback to the community through this report.

TC finally recalled the importance of developing cooperation with coastal countries to identify new deployment opportunities, foster participation in Argo by new countries and facilitate beached float retrieval procedures.

Finally, ADMT suggested that an Argo forum be set up to help students, new comers, to interact more with the Argo member and allow us to get more feedback from Argo users. It was also advised to set up a notification process, like a user subscription function being available for rapid notification of data issues to interested users.

More information in the AIC report (see Annex 6)

3.3. Link with salinity satellites (J Gunn)

The Aquarius Salinity Satellite program has been collecting Argo data from the USGODAE GDAC for approximately 16 months. Surface data from the Argo data are extracted and sent to the data processing system at Goddard Space Flight Center (Maryland) and have been matched up with MODIS temperature data and returned to the ADVS data server in a manner consistent with the procedure anticipated during the satellite mission. Further development in the coming year will include development of a DBMS and web server to provide a user interface and access to the "match up" data files.

The AVDS access the data from the "geo" directory at the GDAC to take advantage of the updating functions at the GDAC. The AVDS collects the data from daily files two weeks prior to real-time. Periodic updating of the database is anticipated to keep up with the updates at the GDAC after the initial download.

We also suggest that a better notification process, like a user subscription function be available for rapid notification of data issues to interested users.

4. Real Time Data Management

4.1. Argo floats only available on GTS and not at GDAC (M Belbéoch)

Mathieu presented the status of GTS-only floats. By far, the largest number of these are old NAVO-equivalent floats, though there are a few Canadian, Indian, and KORDI floats still on this list. The Canadian, Indian, and KORDI floats can be put under the respective DACs easily. AOML expressed concern about the resources necessary to handle all of the inactive NAVO-equivalent floats; they are currently processing all active NAVO-equivalent floats. AOML investigate whether they can process the inactive NAVO-equivalent floats and will report back to the ADMT.

4.2. GTS Directory on the GDACs (S Pouliquen)

Sylvie Pouliquen presented a proposal to remove the "dac/gts" directory from the GDACs. This directory was setup early in the program while the DACs were still under development. Currently there are very few active floats still reporting only on GTS and those will be moved to one of the DACs. There are concerns about the unknown quality of the historical data in the "gts" directory.

The proposal is to move the "dac/gts" data to another location on the GDACs. Expert users could still have access to the data but it would not be available to the general user. The proposal was accepted by all participants with no dissents.

4.3. Status of GTS data (A Tran)

Anh Tran reviewed the status of Argo data on the GTS. There was an average of 8,000 TESAC messages per month on the GTS. Overall 90% of the Argo data are available on the GTS within 24 hours. She noted that KMA data has not been available on the GTS since March 2007. Currently, the cause for this is unknown but it will be investigated by Anh and KMA. After the meeting KMA and

METRI investigated the problem : In order to transfer Argo data to GTS, METRI should upload the data to the system of Korea Meteorology Administration (KMA). Subsequently, KMA transfers the data to GTS. The problem this time was due to a change on KMA's system. The system was changed to new one early spring this year, but the upload folder for Argo data was left in old system. This is the reason why METRI's data had not been transferred to GTS from this spring. Now, they solved this problem,

There are only a small number of duplicates occurring on the GTS. Most of those are from BODC. At the previous ADMT meeting (November 2006), BODC was asked to stop generating duplicates. However, in order to satisfy their primary user – the UK Met Office – it was necessary for them to continue their current practice. After discussion, it was agreed by the participants that this was not a major problem for GTS users and that further action was not required.

Anh reported that the "depths too deep" problem was found in very few reports. Also, the incorrect reporting instrument code was mostly fixed with KMA floats being the only remaining problem.

Anh reported that there are still incidents of non-increasing depths. There are occasional reports with non-increasing depths:

- at the surface coming through the US gateways (KWBC and KARS)
- at the bottom of the profile coming through the Japanese gateway (RJTD)
- with duplicated deepest level coming through the Australian gateway (AMMS)

4.4. Status of GTS problems (M Ignaszewski)

Mark Ignaszewski reported on the status of errors previously seen on GTS. The GTS duplicate problem was already reviewed by Anh Tran.

The problem of reporting pressure on GTS by CLS seems to have come back. It was corrected in mid-March 2007 but a check performed just prior to this meeting found that INCOIS and CSIO floats seem to have pressure on the GTS again. CLS will investigate.

Also, INCOIS and CLS will investigate why the observation times for Indian floats have a 12 hour offset between the GDAC and GTS; the GTS times are 12 hours later.

The status of encoding missing salinity data with "////" was discussed. Coriolis and CLS are waiting for Meteo-France to adapt to handle this correctly before implementing this change. BODC has done the change. The status at KMA is unknown at this time and will be investigated. All other DACs have implemented this.

4.5. CLS Argos Processing for Argo (Y Bernard)

Yann Bernard reviewed the status of Argo data processing at CLS. CLS is currently handling the real-time data processing for 154 floats from CSIO, INCOIS, KORDI, and Russia. CLS is prepared to implement the missing salinity encoding with "///" as soon as Meteo-France is capable of handling the data.

A procedure has been put in place to allow new float types to be added to the system easily. There are currently 10 APEX templates defined.

CLS America is processing all of the US floats for distribution to GTS in close collaboration with AOML. This is done on an AOML computer that CLS hosts. This computer runs AOML software. AOML is also running its' system locally as a backup for GTS insertion and for the insertion to the GDACs. This collaboration has proved to be very good, since AOML can run its software in parallel at two different locations that are far from each other (e.g. in case of hurricanes, regional power failures, ...). In addition to this, as an 'experiment', CLS started reformatting Iridium

data from UW floats. This involves reading ascii data decoded by UW and storing them in a format that can be used by the AOML software for the further processing (QC, NETCDF, GTS...).

An enhanced processing system that will integrate the Argos and GTS processing will be implemented in early 2008. This system will allow more flexibility including the ability to handle more float formats and will allow users to access data through the CLS website. Additionally, CLS is working on the ability to generate both netCDF and BUFR formats.

Yann reviewed the Argos-3 capabilities which include:

- Higher bandwidth – more levels, shorter surface time
- Two way communication – float mission reprogramming.

CLS is now a value-added reseller of Iridium services; the RUDICS Iridium service will be implemented in 2008. CLS will be capable of handling Iridium Argo floats in 2008.

4.6. Consistency of RT QC checks between DACs (C Coatanoan)

At the last ADMT (November 2006), it was decided to provide to each DAC a standard dataset to check their own quality control tests. A few tests needed to be implemented or more defined. Following those results many improvements of the actual tests have been done by some DACs to fit with the expected results of the standard data sets. Others anomalies are still passing through the automatic tests and improvements of those tests have been suggested (following table).

TEST	**PROPOSAL**	**ADMT8**
Test 19 - Deepest pressure	Keep Flag 4 on Pressure but change Flag 4 to 3 for T & S	Rejected
Test 5 - Speed test	Keep Flag 4 on Location but change Flag 4 to 3 for T & S	Rejected
Test 6 – Global range	2 PSU for the minimum PSAL	Accepted
Test 8 - Pressure increasing	Iterative test until no more pressure inversions are found, removing flag 4	In test
Test 9 - Spike	Iterative test until no more spike are found, removing flag 4	In test
Test 11 - Gradient	Iterative test until no more gradient problems are found, removing flag 4	In Test
Test 14 - Density inversion	Iterative test until no more density inversion are found, removing flag 4	In test
	Sigma0 or Density	What parameter to be used ? To be tested
	Value of threshold and equation	Not accepted, has to be more tested
Consistency between QC on TEMP and PSAL	PSAL_QC=4 if TEMP_QC=4	Yes if the float transmits conductivity NO otherwise

4.7. "Identifying 'subtle' problems in float data" (John Gilson)

A trial analysis was performed to see if a simple standard deviation check can identify Argo floats with 'subtle' problems. Statistics were derived from Argo data only. The standard deviation envelope check was made to all Argo floats which were included in the statistics as well as 5 WHOI FSI (pressure offset not corrected). All 5 WHOI FSI pressure offset problems could be identified, as well as additional floats with problematic format/data and transient features (Meddys, etc). The latter may be reduced by introducing additional statistics into the climatology. Future work will be to identify the ideal balance between excess identification of good data and successful identification of bad data.

Dean suggested that several groups work on this issue and start to implement methods to be able to detect suspicious floats or profiles in near real time. These groups should provide the list of profile/float data to the Argo community. A discussion on this topic is planned at next AST meeting and ADMT will be informed on the recommendation made by AST on this subject.

4.8. Status on WHOI Solo floats (Dean Roemmich on behalf of Breck Owens)

Dean Roemimich reviewed the status of the pressure offset problems encountered in WHOI floats. There were 3 categories of problems:

- Seabird sensors: The pressure reported was for the bottom of the pressure bin instead of the mid-point of the pressure bin. The effects were smaller than the other errors and the offset are automatically correctable. The real-time distribution was corrected in September and the historical GDAC profiles have been updated. These floats were never greylisted.
- FSI - category 1: Floats in this category had adequate information in the meta-data to automatically and exactly correct the pressure offsets. These floats have been corrected in the real-time data (GDAC and GTS) and the historical GDAC files have been updated. These floats have been removed from the greylist.
- FSI – category 2: Floats in this category do not have adequate information in the meta-data (a software bug) and require expert review to correct the pressure offset. With a time-series of the float profiles the pressure bins can be inferred and the pressure offset corrected. These floats will be corrected in delayed-mode.

5. Trajectory from Argo data

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

Issues related to trajectory can be summarized along two lines : :

- Make the DAC fill in properly the ASCENT_END and DESCENT_START dates and correct the files that are presently on the GDACS. Because of man power issues at NOC, Brian King didn't manage to carry out the "educational "step but is confident to get somebody to fix this problem with the various Dacs early next year. Nonetheless DACs have progressed alone and big advance has been to fix problem for Provor (see below). Brian will provide a summary of what needs to be done for APEX floats in the report.
- Improve the extrapolation method based on what JJ Park did and published in 2005. Compared with Park et al's published method, time weighting by age of fix improves the extrapolation. The method works well except when there are not enough fixes to constrain the inertial part.

The intention is to have an algorithm which can be implemented automatically at the GDACs. The proposal is to generate a new file that will have a new parameter fields while the Dacs will continue to generate the RT trajectory files accumulating the raw information. This will therefore be an Argo product that will be provided at GDacs and will be documented separately.

While working with trajectory files, errors in cycle numbering are regularly found. Most Dacs intend to correct the cycle numbers when they discover it. It's suggested to update the manual to define the meaning of the cycle 0 for the different float types. This has to be clarified with technical people and inform user on the present situation. Claudia reminded that if a float transmits a cycle number then that's the one we should use.

5.2. Trajectory work done on Provor at Coriolis (T Carval)

Thierry Carval presented the work done at Coriolis first to better understand each float family behavior, then to clean up both Provor and Apex floats at Coriolis DAC. They have found problems such as incorrect cycle numbers, dubious timing, missing a few location, and inconsistencies between data and metadata. Then , in collaboration with M Ollitrault, French scientist collaborating both with Coriolis and Brian, various versions of methods, similar to Brian's one, are presently tested to estimate sub-surface velocity fields.

50% of Coriolis data have been corrected and Coriolis team is working on the remaining ones

Thierry mentioned that some metadata, characteristic of a float family brand, were missing to calculate without ambiguity the ASCENT_END and DESCENT_START dates . These can be recorded in the Configuration information that will be stored in the technical file for which the format is currently being redesigned.

6. GDAC Services

6.1. What's new at Coriolis and US Gdacs (T Carval, M Ignaszewski)

Thierry Carval reviewed the status of the GDACs. His main finding was “The GDACs are stable and running smoothly”. Reports to the contrary are requested. Since the GDACs are a major component of the Argo data system, this is one measure of success.

At Coriolis, a user desk was implementing behind the codac@ifremer.fr email and all questions and answers are registered in a data base.

A procedure for the automated submission of DAC greylists is now available. The French GDAC has fully implemented the process. The US GDAC will implement the process by mid-December. This will replace the manual process that is currently used.

There was an action to install CDFSync at GDACs. A study was performed at the computer department at Ifremer. Security vulnerabilities were identified by the French national authority for computer security so it won't be implemented at the Coriolis GDAC. The US GDAC cannot implement CDFSync on its current servers and would likely have similar security issues on its new servers. Therefore, CDFSync is not currently considered a viable solution for maintaining synchronization.

Thierry reviewed the basic rules of synchronization of the GDACs: the importance of DATE_UPDATE was stressed. *DACs are requested to pay special attention to keeping this current*.

Pending actions:

- AST request : Add a "Salinity Adjustment" column to the profile index file to allow users to evaluate the reliability of salinity data prior to downloading the profiles. This will be the average of (PSAL_ADJUSTED - PSAL) over the deepest 500 meters.

- "Hide" the GTS directory from the DAC directory. (See S Pouliquen proposal above.)
- Add an MD5 signature file for every file on the GDAC. This will increase the reliability of the GDAC synchronization and will allow users to verify the correctness of their file downloads. MD5 signature generation software is freely available and will be documented at the GDACs.
- Automated file removal between the two GDACs. DACs will still send e-mails to both GDACs to request file deletions but the GDACs will automate the process of deleting the files. This continues to be source of problems for synchronization.
- Latest-data directory:
    - During large updates (for instance, the large influx of D-mode files prior to this meeting) the latest_data files become very large and unmanageable. The two GDACs handle this situation differently. It would help users to split the files based on a size limit and to handle it consistently between the two GDACs. It was also suggested that the history section could be removed from these files. This was accepted as an action for the GDACs; prior to implementation, the user community will be informed of the change via e-mail lists and GDAC messages. The possibility of compressing these files was also suggested and will be considered by the GDACs.
    - It was also suggested that perhaps having a latest_data file which is only new (or recent) data separate from "latest_data" that is a replacement of older data (for instance, D-files) might be useful. This will be investigated and a proposal will be submitted to the Argo mailing lists.
    - Coriolis will compress its index files similar to what is done at the US-GDAC. Plan to remove weekly index files unless we find users in the logs.

Two important notifications will be stressed:

- Users will be advised that QC procedures only exist for salinity, temperature and pressure data (only salinity for DMQC) and that other parameters (for instance, oxygen) are not quality controlled. This was an action from the last ADMT meeting that was not acted upon.
- Promote the support@argo.net on GDACS to report reports, issues, and questions.

6.2. Status of Format Checking enhancements (Mark Ignaszewski)

Mark Ignaszewski reviewed that status of improvements to the format checking performed at the GDACs. Currently, only the format of the files is checked. The Delayed-mode QC and Trajectory workshops held last year identified several additional parameter checks that are required.

The format checking software is being updated to include consistency checking on most parameters within the profile files. The general checks that will be performed are:

- "Highly desirable parameters" – the high desirable parameter checks performed on meta-data files will be applied to profile files which include DATA_CENTER, INST_REFERNCE, WMO_INST_TYPE, and POSITIONING_SYSTEM
- Dates: All dates will be checked for validity and consistency
- QC flags: All QC flags will be checked for validity and the PROFILE_<PARAM>_QC flag will be checked for consistency with the respective <PARAM>_QC flag.
- Check the consistency of the DATA_MODE, STATION_PARAMETER and <PARAM> variables.
- Perform specialized checks identified by the DM workshop.

Once the new checking software is ready (January 2008), it will be implemented in the DAC "test" directories to allow DACs to test the system and comment on the results. When generally approved, the system will be implemented operationally at both GDACs. A grace period (warnings only) will be allowed so DACs can bring their real-time files into compliance without adversely affecting the real-time data flow.

The historical files on the GDAC will be scanned and the GDAC managers will work with the DACs to bring the full dataset into compliance.

Similar tests will be applied to the trajectory files once the profile file enhancements have been implemented.

When this is done, users should use the support@argo.net to report remaining problems.

7. Format issues

7.1. BUFR Format (??? For Takashi Yoshida)

The Argo BUFR template has been operational since 7 November 2007. The parallel operational period for BUFR and TESAC distribution continues through 2012.

Two standard tools have been developed to convert netCDF to BUFR messages; a Perl tool is available from JMA and a Java tool is available from MEDS.

Status of BUFR data transmission:

- AOML: tested the Java tool and awaiting minor upgrades to the tool.
- BODC: tested the Perl tool and is nearly ready to begin transmission on GTS.
- CLS: new processing system will include BUFR capability; to be implemented in early 2008.
- Coriolis: tested the Perl tool and submitted test data to Meteo-France for validation.
- CSIRO: will test Perl tool and implement during 2008
- JMA: currently transmitting BUFR messages on GTS
- KMA: testing BUFR capability and will implement soon.
- MEDS: will begin GTS transmission soon.
- (INCOIS, CSIO: Dependent on CLS developments.)

7.2. Glider data format proposal (T Carval)

Thierry Carval presented a proposed format for glider data files that was developed in cooperation with Breck Owens. The format is based on the Argo trajectory files and the OceanSites glider format. The format is consistent with the netCDF Style Guide and is CF/COORDS/Udunits compatible.

A single netCDF file would be used for each glider deployment. Meta-data would be stored as global attributes and the glider observations would be stored as netCDF variables. The format would be able to store the data as vertical profiles or as time-series.

Real-time distribution of the data was discussed. It was noted that the daily information that is available is only a small subset of the full data. The full data is not available until the instrument is retrieved. French glider data is already being disseminated in near-real-time on the GTS in TESAC format.

Whether or not glider data should be integrated under the Argo umbrella is a question that should be addressed by AST.

7.3. What metadata are mandatory for Oxygen (T Kobayashi)

A working group has been established by the AST to look at Oxygen Data quality issues. There are currently many issues that must be addressed including the biases/offsets/trends of the DO sensors, consistency between the sensor types (SBE and Optode), and the meta-data that is required.

The working group will develop data procedures for the DACs to ensure that a consistent DO dataset is produced regardless of the sensor employed. The working group will submit their proposal to the AST. Once the proposal is reviewed and accepted by the AST, actions will be referred to the ADMT for implementation. Taiyo noted that it may be a long time before delayed-mode procedures exist for DO data.

FYI: Taiyo had suggested to the working group that:

- For the Optode sensors, the DOXY variable should contain the raw data and the DOXY_ADJUSTED variable should contain the "shore-based" adjusted data after applying the manufacturers calibration equation.
- A range check be added to the real-time QC procedures; any DO value < 0 or > 650 u-mol/kg would be flagged 3 or 4

For now, the DACs are requested to ensure that the meta-data are correctly filled for the DO sensor:

- PARAMETER should contain "DOXY" and "TEMP_DOXY", if appropriate
- SENSOR should contain "DOXY" or "TEMP_DOXY",
- SENSOR_MAKER should contain "Aanderaa" or "SBE"
- SENSOR_MODEL should contain the model, for instance "Optode 3830" or "IDO (SBE34F)"

7.4. Technical File Proposal (A Tresher)

Ann Thresher presented the conclusions of the Technical File working group; the working group consisted of Ann Thresher, Claudia Schmid, Vito Dirita, and Serge le Reste. Ann reviewed the problems that have been identified in the format of the technical files. The proposed changes were discussed and are described below; the working group will update their proposal based on the discussion and will circulate for review.

It was proposed that the length of the TECHNICAL_PARAMETER_NAME be increased to 128. The length of the TECHNICAL_PARAMETER_VALUE will also increase from 32 to 128 characters to allow for some technical data that will be stored as equations. This was accepted by the meeting.

After discussion of the file format, the proposal to create one technical file per profile was rejected and it was decided to change the format to be similar to the trajectory files. The TECHNICAL_PARAMETER_NAME and TECHNICAL_PARAMETER_VALUE fields will now be vectors with dimension N_TECH_PARAM. An additional variable – CYCLE_NUMBER – will have the same dimension. This allows variable numbers of parameters for each cycle while still identifying the cycle to which the parameter belongs.

The new dimensions are:

STRING128 = 128;
N_TECH_PARAM = unlimited;

We do not need N_CYCLE as a dimension.

The new field dimensions are:

char TECHNICAL_PARAMETER_NAME(N_TECH_PARAM,STRING128)
char TECHNICAL_PARAMETER_VALUE(N_TECH_PARAM,STRING128)
int CYCLE_NUMBER((N_TECH_PARAM)

Rules were proposed and accepted for the creation of technical parameter names.

These are:

- The names will be split into three parts: The first part is WHAT is measured (voltage, current, etc). The second part is WHEN (e.g., ascent end), WHAT (e.g., internal vacuum) or WHERE (e.g., surface). The last part of the name will always be UNITS.
- These parts will be separated by underscores.
- Do not allow mathematical symbols (+,-,*, etc).
- The first part will be in CAPITALS. The second part will be one word of mixed case to make it as readable as possible (see example below). The units can also be of mixed case. Only defined units can be used and additional units can be added if necessary.

An example of a name is: **TIME_FloatClockInitialStabilization_DecimalHour**, defined as time when first stabilization takes place (tenths of an hour since midnight) and valid for PROVOR-CTS3 floats. All this information will be contained in a table of names that can be consulted by users who need to name variables they haven't previously used.

Tables of parameter names and units will be held at Coriolis. It is very important that we use consistent units, convert counts to something 'real' and yet are flexible enough to add units and names if necessary. Technical parameter names are more useful if they have a definition. We will work to create a table with all names currently in use but will need input from the users.

- Surface pressure offset MUST be reported if it is measured by the float.

If the pressure is truncated and 5m has been added (Apex floats with the older APF8 boards) the technical parameter name will be:

PRESSURE_SurfaceOffsetTruncatedPlus5M_dBAR

If the pressure is true as measured (+/-, nothing added) (most other floats and APEX floats with new APF8 or APF9 boards), the technical parameter name will be:

PRESSURE_SurfaceOffsetNotTruncated_dBAR

7.5. Status of Format Change actions (T Carval)

Thierry Carval reviewed the status of format change actions. He pointed out that format changes are very time consuming and difficult to implement and, therefore, should only be undertaken rarely. On the other hand, manual updates can be implemented easily. Actions 36 – 39 can be satisfied without changes to the current formats.

The manuals will be updated to describe how to capture the required information in the meta-data and technical data files to capture the required data items:

- Apex_up and apex_down information
- Sensor model and sampling information for thermal mass correction
- Additional trajectory information via a separate delayed-mode trajectory file that is considered an Argo product.

8. Delayed mode data management

Dean presented the following week out statistics of DM files at GDACS. He reminded that a profile that is older than 12 months (the first column named "D Files >12 months") should be processed while it's not mandatory for younger ones.

DAC	D Files >12 months	Total Files >12 months	%	Young D files	Young R files	Total D files
AOML	71576	122619	58.4	4579	53874	76155
/SIO	28501	28826	98.9	1886	12288	30387
/UW	30765	37360	82.3	2180	13861	32945
/PMEL	10085	11851	85.1	423	7454	10508
/WHOI	686	26483	2.6	0	14184	686
BODC	4443	12412	35.8	49	3429	4492
CORIOLIS	23843	42947	55.5	1343	12308	25186
CSIO	1235	1244	99.3	304	84	1539
CSIRO	6594	7268	90.7	507	4033	7101
INCOIS	7083	10082	70.3	614	2944	7697
JMA	23968	42185	56.8	2254	14108	26222
KMA	851	4096	20.8	63	1698	914
MEDS	11763	12647	93.0	736	2542	12499
TOTAL	151356	255500	59.2	10449	95020	161805

At present there are 100 000 eligible profiles that have not been processed :

- half of them come from USA Argo (WHOI has no man power at present and 20 000 of Argo equivalent floats are not yet assigned to any DM operator)
- another large group come from Coriolis and JMA and it's progressing pretty rapidly.

The goal is to be above 80 % (preferable by 90%) for next ADMT meeting

8.1. Feedback from DM operators on their difficulties (Brian King)

An enquiry has been sent to delayed mode operators to get their feedback after a year of processing delayed mode profiles.
While manpower seems to be an issue in some delayed mode programs it's not the case in all of them. The lack of reference database was not identified as the main problem in most areas even if some delayed mode operators mentioned that they had difficulties to take decision because few reference data in their area. It seems that in some regions like the southern ocean people have difficulties to process their floats and may be some "training" or better sharing of experience would help. Finally there does seem to be a bottleneck of hard floats that simply take a long time to make a good decision. Dean suggested that DM operators should use the nearby Argo floats to decide what to do and reminded that there is an AST action to define what would be the criteria to include Argo floats in the reference database.

In order to enable operators/PIs to compare their own decision-making with other groups, Brian suggested that operators generate an extra plot, containing the OW proposed adjustment, with the operator's decision and error bar clearly over-plotted. This new plot, together with the OW diagnostics and any other text comments/plots that the operator saves for their own use, should be made available by FTP (organized by WMO number) where other operators could view them. After one delayed mode cycle, all active floats will be displayed in this way, and we will have an invaluable tool for helping less experienced operators make decisions. It was agreed not to make these plots public, at least in the first instance.

After discussions during this meeting it became very clear that another DMQC is needed probably around September 2008 to be able to solve remaining problems . After the meeting Steve Riser was contacted and he has accepted to host a DMQC-3 meeting at University of Washington in Aug or Sep 2008.

8.2. Testing the new OW salinity calibration tool : summary of the DM operators feedback (A Wong, B Owens)

During 2007, the OW salinity calibration tool was tested in the North & South Atlantic oceans by Christine Coatanoan and Elodie Kastenare, in the Weddell Sea by Olaf Klatt, and by Birgit Klein. Useful feedbacks were provided by all. The general conclusion is that OW and BS show similar results in the Atlantic oceans. (For further details, please refer to Christine's report that is posted on the meeting website). Other OW users have reported successful usage, particularly with regard to being able to discern the start of sensor drift.
There have been some minor improvements based on feedback from Christine, Birgit and Olaf; such as cleaning up some variables and redundant lines in codes to improve Matlab memory usage, improved labelling of the longitude axis at the 0-360 boundary, adding more details to the README file.

The website http://prelude.ocean.washington.edu/references.html has been updated, together with the referral that the DMQC reference database is now located at Coriolis.

Some anomalies were detected and improvements suggested which Annie and Breck are still working on:

- Coriolis showed an example where the fitting scheme failed to pick up sensor drift when 2 profiles were excluded from the float series, whereas the fitting scheme correctly showed sensor drift before the 2 profiles were excluded.
- The planar fit is giving strange results in some instances.
- OW, WJO, BS … they all underestimate the errors.
- Changing the length of the float series will change the fit.
- Modify the diagnostic plot to show various unique series.
- Separation of circumpolar frontal regions in the Southern Ocean.
- Some day there may be a manuscript **….**

A new version is planned within three months

8.3. "(Non-) problems with using WJO or similar methods to calibrate Southern Ocean floats", by A. Wong

Annie Wong reminded that oceanographic features that are important to be able to process properly floats in the southern ocean using the OW method. Circumpolar Deep Water (CDW) is a deep water mass that is derived from North Atlantic Deep Water. It is an old water mass, is present all around the

Southern Ocean, has small S variance on θ levels, and so is a good water mass for float calibration.. Depending where you are in the Southern Ocean the way to proceed is different.

1. North of the Polar Front: Unfortunately, here CDW is generally found at depths deeper than 2000 dbar, which is deeper than Argo's sampling depths. Above 2000 dbar at these latitudes, water mass structures change abruptly across the Sub-Antarctic Front (SAF). The accuracy of float salinity calibration here relies on using a set of tight spatial decorrelation scales and a thin vertical envelop in the objective analysis, and on selecting historical data from the same side of the SAF as the float profiles. Sallee has developed an automated procedure to carry out this selection. Plans to incorporate Sallee's procedure into OW within the next three months. Separation of the Subtropical Front (STF) and the Polar Front (PF) will be explored later if needed.

2. South of the Polar Front: CDW rises to shallower depths (close to 500 dbar) due to upwelling associated with the Antarctic Divergence. Here, floats can be calibrated by using CDW.

WJO will work for waters colder than 2.5°C and below 500 dbar (i.e. CDW), because at that range there is no T inversion. The temp range is narrow, but there are sufficient θ levels to produce a stable least squares fit. OW, however, is the better choice.

The Southern Ocean is relatively data poor. However, not many reference CTD profiles are needed to produce reliable objective estimates for some water masses. So for areas with no data, any small amounts of additional reference CTD data will help.

8.4. "Thermal Mass Correction and Real-Time flags: SIO Floats" (John Gilson)

SIO floats were used to find the change in occurrence of the quality control flag '4' after applying the thermal mass correction (Johnson et. al., 2007). Inversions that are found at the base of the mixed layer that can be attributable to thermal mass errors are typically smaller than -.01 kg/m3 for the SIO SOLO floats. As the AOML DAC applies a density gradient test that allows larger inversions (equivalent to a threshold of -.05 kg/m3), few inversions that could be attributable to thermal mass, were flagged '4'. Therefore there is little improvement in these occurrences of bad flags. However, the application of thermal mass, does reduce the occurrence of inversions. Approximately 50% of inversions are completely removed and an additional 20% are greatly reduced, in the inversion range of -.004 to -.008 kg/m3.

9. Progress on Argo Reference data base

9.1. Summary of the actions since ADMT-7 (C Coatanoan)

Since last ADMT meeting each delayed mode operator has continued to improve the reference database and regional databases have been updated (SeHyd for the Pacific, IOHB for the Indian, BS + ATL CTD for the Atlantic) they are all available from **http://www.coriolis.eu.org/cdc/dmqc_reference_db.htm .** Their format has also been adapted to the OW DMQC software (i.e. All profiles will be stored in original un-interpolated vertical resolution)
.

Coriolis has collected WOD2005 CTD and has integrated them in the Coriolis database. Duplicate checks and an automatic QC have been performed. Statistical QC test is underway and suspicious data will be checked by an operator. Similar test have been done with the latest data provided by CCHDO (the one CCHDO provided on DVD were already integrated in WOD2005). Coriolis is working with CCHDO to establish a list of CTD available in the CCHDO but not in the Coriolis list. CCHDO will then prepare a CTD's package to make available for Coriolis.

It also plans is to release the AGO-2008-01 reference data base in March 2008

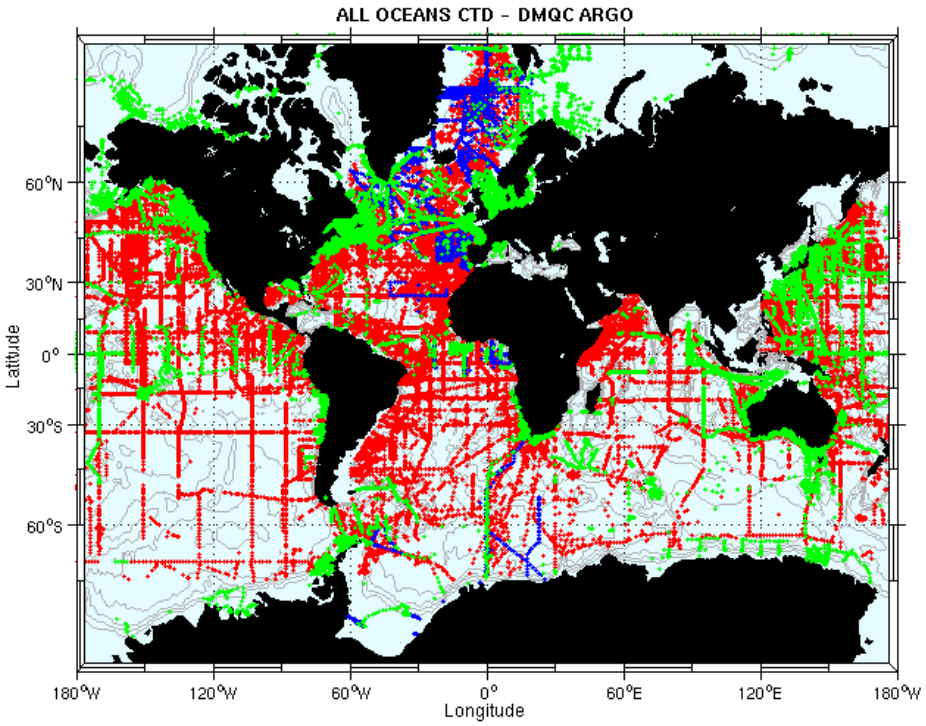

Figure 1: In red the present reference database, in blue the TCD added in Atlantic, in green the WOD005 update

The reference database will be updated using the following section criteria :

- use only data that have passed all NODC QC, tests for observed level data
- use only profiles that sampled deeper than 900 dbar
- weed out all data points outside these ranges 24<S<41
- WMO boxes with more than 10000 profiles, only select profiles that are post-1995
- eliminate nearby duplicates
- do objective residual analysis using previously qc-d reference data to identify anomalies and do visual inspection of anomalies
- identify each reference profile with a unique ID

It is recommended that in regions with adequate reference data, that delayed-mode qc on PSAL should use CTD data only. If CTD data are too sparse (Southern Ocean), BOT data may be included.

The feasibility of using Argo profiles in the reference data base, satisfying a set of criteria defined by J Gilson, is at present studied by the AST and recommendation will be made next March to the ADMT.

9.2. Regional reference databases: Introduction of SeHyD/IOHB for OW-DMQC (T Kobayashi)

Taiyo presented the work made at JAMSTEC to update SeHyd and IOHB , respectively regional reference database for Pacific and Indian Oceans. The data have also been made available in the original un-interpolated vertical resolution for OW software. Bottle data have been introduced in these regional DB and Taiyo felt that the results were better using bottle data in areas where CTD are sparse. Annie agreed but mentioned that this should be done very carefully and reminded that in some areas of the Southern Ocean the water masses are stable enough so that not much CTD are needed.

Jamstec plans to integrate WOD05 CTD and Bottles in SeHyd and IOHB. It's also plan to add Indian CTD into IOHB. Sylvie reminded that WOD2005 were under integration at Coriolis and therefore duplication of efforts should be avoided. It was also recommended to send the Indian historical CTD to Coriolis for all Argo partners.

Jamstec also plan to build a reference database that will include the floats selected according to J Gilson rules when validated by AST.
Jamstec also plan to prepare datasets of the marginal seas in the Pacific sector such as the Southeast China Sea, the South China Sea The Okhotsk Sea

In collaboration with NFRDI/Korea, a reference database has been created for the East Japan sea and was presented by Joon Yong Yang. It's now used to DMQC floats in this area. Some of the data included in this marginal sea are not public and the group advised Korea to make this available in the Argo reference data base in 2008.

It's is clear that a procedure has to be defined between the ARCs and Coriolis to update in the future the Argo reference database with the new CTDs that will be collected at regional level. A proposal will be made at ADMT9.

9.3. CCHDO contribution (Steve Diggs)

Steve Diggs reminded that CCHDO was first invited to contribute to this activity in March 2006. Jim attended the ADMT6 meeting in order to better identify the ARGO needs. In March 2007 CCHDO represented Argo at the IODE meeting and highlighted the fact that Argo program needed recent CTD data for sensor drift estimation: IODE (NODCS' network) was not aware of this need. In continuation of this work with the NODCs' network a meeting between USA-NODC and CCHDO was held in September this year. As a result of this meeting it was decided that NODC will work closely with CCHDO to enhance their ability to extract recent CCHDO data on a quarterly basis, starting January 31, 2008. Full updates, including non-public data will be pushed directly to Coriolis by CCHDO. The non-public data, transmitted either by PI or ARC, will be available to NODC for distribution with a few months (up-to-years) delay when the PI has given permission.

The Southern Ocean is a data-sparse area and Steve highlighted the fact that CCDHO has collaboration with major programs collecting programs in Polar Oceans (US Repeat Hydrography, DIMES, SASSI, CARBOOCEAN, GEOTRACES and others are expected in coming years).

At present CCHDO has about 63 post-2000 cruises that are not in WOD2005 nor at Coriolis. CCHDO is working to share the public data with NODC and to provide all of them to Coriolis. A transfer test has already been done with 2 Pirata cruises of 2007

CCHDO would like to work with ARCs to update contact list and get in touch with more PIs and build with them the trust they need to share there data. CCHDO has set up a non-public area for Argo program for PIs who accept to share their CTD for Argo delayed mode QC but are still reluctant to make them public until they finalize their calibration. CCHDO and ARC has to advertise this capability even though we should encourage free access to CTD as it is at present for Argo data.

Steve mentioned that some people who give CTD would like to be seen as Argo contributors. We agreed that it's a good idea to attach a list to the reference database

If a PI wants to provide data and doesn't care where to send it , he should send it to CCHDO who will provide the qualified data both to US-NODC and Coriolis

9.4. WOD perspective for Argo (Tim Boyer US-NODC)

Starting in February 2008 the WOD database will be updated on a quarterly basis. This is motivated by the fact that NODC is funded to update ocean heat content every 3-months (Data must be available for reproduction), that data originators want to see their data available in a more timely manner and Argo salinity adjustments need most current data.
The entire public online database will be updated from internal database and a notification will be sent out via RSS feed. The update files will be available at http://www.nodc.noaa.gov/OC5/WOD05/updates05.html and will contain the new data received by NODC since WOD05 was issued.

More timely release of World Ocean Database updates can help to meet the needs of the Argo community for timely access to salinity (and other) data.
Tim suggested that the user have directly access to the value of the salinity adjustment to decide whether or not he will use the profile: this information will be stored in the index file at GDAC in the coming months.
Even if Argo data system is the gold standard, but there is still a need for better communication of information to users and action have been decide during this meeting to improve the situation (see action list in annex4)

Now on the challenge will be for US-NODC and CCHDO to work together to provide to Coriolis with updates without duplicates…

10. Argo Regional Center (ARC) Workshop feedback (J Potemra and C Schmid)

The first 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 ARCs have made progress identifying and receiving CTD data from PIs that would not have been available through other mechanisms. This effort is ongoing and the ARCs will continue to work with PIs to convince them that their private data will be kept private.

The ARCs are still developing programs to provide consistency checks for their regions (some prototypes already available). A working group comprised of members of each ARC was formed to standardize the ARC consistency checks.

It was noted that a mechanism for the ARCs to provide feedback to the PIs is required. It was felt that the ARCs need to be able to push the information directly to the PI rather than requiring the PIs to pull the information from a website.

Orphan floats for DMQC: in most of the cases a DM operator was found.

JAMSTEC expressed that it is willing to contribute to the Southern Ocean ARC for the Pacific Ocean sector of the Southern Ocean..University of Washington has volunteered to contribute in the Indian sector for the Southern Ocean ARC..

For detail see ARC-1 meeting report

11. Global Argo Data Repository Status Report for 2007 (C Sun)

Charles Sun reviewed the status of the GADR. The GADR provides offsite storage and archiving of GDAC meta-data, profile, technical, and trajectory files. It also provides a mirror of the US GDAC and serves as an unofficial provider of the data. The mirror process updates the GADR twice a day. The GADR monitors usage statistics and presented a summary showing the increase in hosted and files served over the last three years.

The GADR also provides some quality monitoring, including detecting pressure being sent on the GTS. Charles was requested to provide a report of pressure on the GTS to the AIC the first week of every month so it can be included in the AIC monthly report.

Charles noted there were almost no problem reports submitted to the GDACs during this year and suggested that this was a measure of the success of the data system.

The GADR also has the capability to provide a DVD containing the Argo dataset. A DVD was provided to AOML for the Ghana workshop. A new issue will be produced by the end of 2007 and online versions will be available to be printed on request by users. Online versions can be accessed through:

- Online version - http://argo.nodc.noaa.gov
- Compressed version (.tgz) - http://data.nodc.noaa.gov/argo/dvd and ftp://data.nodc.noaa.gov/pub/data.nodc/argo/dvd
- ISO9660 image version (.iso) - http://data.nodc.noaa.gov/argo/dvd and ftp://data.nodc.noaa.gov/pub/data.nodc/argo/dvd

NODC is also cooperating with CCHDO to maintain a current set of the public CCHDO data on a quarterly basis.

12. Summary of the 8th ADMT actions (S Pouliquen M Ignaszewski)

The action list that is in annex 4 was approved by the participants.

13. Location of 9th ADMT

Next ADMT meeting will be hosted by IPRC in Hawaii from the *29th-31st October 2008*. It will be preceded by the *2nd ARC meeting on the 28th October*. The executive meeting is planned on the 27th afternoon

14. Annex1 : Agenda

1. **Feedback from 8th AST meeting : (30mn) Dean Roemmich**

2. **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 version of the user desk will be presented.

Status on the actions 1,2,3,4,5,6,7

- ***Review of the Action from last ADMT*** *(S Pouliquen)15 mn*
- ***Argo Status*** (M Belbéoch)
- ***Development of the AIC*** (M Belbéoch)
- ***User Desk*** (M Belbéoch)
- ***Link with salinity satellites*** *(J Gunn) 15mn*

3. **Real Time Data Management (2h00)**

Review the Argo real time data stream, the status of actions from ADMT-7 and identify new actions needed to improve the volume, timeliness of delivery and quality and ease of Argo RT data.

Status on the actions :4,7,18,19,20,21,22,23,24,25

- **Real-time availability**: 15mn (M Belbeoch)
  - Argo floats only available on GTS and not at GDAC
  - Historical Dataset action 4

- **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 - Actions 19-20-21 (M Ignaszewski)
  - GTS directory on GDAC (S Poulquen)

- **Improvement of CLS realtime processing chain** (Y Bernard) 15mn

- **Consistency of RT QC checks between DACs** (C Coatanoan) - Action 23-24: 30mn

- **Status on WHOI Solo floats** (Breck Owens) 30mn

4. **Trajectory from Argo data (1h30)**

Status on the actions 10,11,12,13,14

- **Feedback on Trajectory progress since ADMT8** (B King)
- **Trajectory work done on Provor at Coriolis** (T Carval)
- **Data Flow proposal for delayed mode processing of trajectory** files (S Pouliquen)

5. **GDAC Services (1h30)**

What's new at GDACs and Improve services for users.

Status on the actions : 15-16-17-30

- **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?**

6. 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 : 36,37,38,39,40,41

- **BUFR Format** : Status on the experimentation phase + conversion tool (T Yoshida)
- **Technical Files** Action 41-42 (A Tresher)
- **Status on Format Change proposal** for actions 36 to 39(T Carval)
- **Proposal for a glider format** (T Carval, B Owens) AST8 action 4
- **What metadata are mandatory for Oxygen (**Taiyo Kobayashi)

7. Delayed mode data management (3h00)

Status on the actions 26,27,28,28b,29

- Review backlog of DM QC what is the status (Dean or Megan ?)
- Feedback from DM operators on their difficulties (ask for contributors)
- Testing the new OW salinity calibration tool : summary of the DM operators feedback (A Wong B Owens) 30mn
- Problems with using WJO or similar methods to calibrate Southern Ocean floats (A Wong) 30mn
- Discussion

8. Progress on Argo Reference data base (1h00)

Status on the actions 31,32,33,34,35

- **Summary of the actions since ADMT-7** (C Coatanoan)
- **Introduction of SeHyD/IOHB for OW-DMQC** (T Kobayashi)
- **CCHDO-NODC progress** (S Diggs)
- **Discussion** on improvement requested

9. 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)

10. GADR (1h00)

Status on the action 44

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

11. Other topics (1h00)

- **Summary of the 8th ADMT actions** (S Pouliquen M Ignaszewski) 15mn
- **Location of 9th ADMT**

15. List of Participants

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16. Annex 3 : 7th ADMT meeting action list

	Action	Target Date	Respon sibility	Status
	Monitoring Actions			
1	AIC to integrate MEDS statistics on GTS problems as well as Coriolis metadata check in the bi-monthly report	M Belbeoch	End 2006	Completed
2	AIC to implement and document a reliable Argo user desk behind the support@argo.net email to ensure that all request are processed and to provide history of the request to the ADMt and AST partners.	M Belbeoch	AST8	Completed
3	Promote the support@argo.net via the Argonautics newsletter, at GDAC at AIc when the system is in place	M Belbeoch	After action 2	Completed
4	From information provided in AIC report, Dac managers to inform AIC and ADMT chairs for each historical float only received by GTS whether or not they will be able to generate the netcdf files	Dac managers	End 2006	JMA KMA Coriolis AOML Russia By MEDS Kordi Format PB to solve Some individual cases to be sorted out (see AIC report)
5	AIC to monitor the progress on reducing the historical GTS backlog	M Belbeoch	March 2007	In monthly report and AIC WWW
6	AIC to implement periodic statistics to measure the progress on ARGO data management activities	M Belbeoch		Started see progress on monthly report and AIC www
7	Checklist for new RT operators for Grey list	A Tran & S Contardo	ADMT 8	Started
8	More visibility to be provided to ARC from ARGO WWW sites (argo.net, AST, GDAC)	M Belboch Megan T Carval M Ignaszewski	End 2006	Done at AIC, AST and Coriolis GDAC
9	RDAC managers to change to name on their WWW to ARC(Argo Regional Argo)	ARC managers	End 2006	Completed
	Trajectory Actions			

10	Dacs to correct they metadata and trajectory files according to the specification from Trajectory team	Dac managers	AST8	AOML : Done Coriolis Started CSIRO regenerated files and waiting for verification from traj group KMA waiting for Taj group recommendations
11	AIC to monitor the progress	M Belbeoch	AST8	Waiting from spec from Traj group
12	Data flow for delayed mode processing of trajectory files to be proposed	S Pouliquen to coordinate	AST8	A proposal will be made at ADMT8
13	Argo-traj-dm mailing list to be set up by AIC	M Belbeoch	End November 2006	completed
14	GDAC to implement file checker on trajectory files according to trajectory group specification	B King and M Ignaszewski	AST8	Waiting from spec from Traj group
	GDAC Actions			
15	GDACs to correct problems in synchronization	M Ignaszewski and T Carval	AST8	completed
16	GDACS to implement CDFSync on their servers	M Ignaszewski and T Carval	ASAP	Cancelled at Coriolis for Security reason
17	Gdacs and DACs to clean up the remaining 2.1 files form GDACs	M Ignaszewski to coordinate	AST8	There is still some 2.1 files to be processed by Dacs
	Real-time QC Actions			
18	MEDS or AOML to process the two pacific ocean Russian floats from argos messages to send them to GDAC	A Tran or C Schmid		Completed by MEDS
19	BODC to stop generating duplicates on GTS	S Contardo	March 2007	UK decided to continue to generate duplicates. What is the impact on users from GTS……
20	CLS to report depth instead of pressure on the GTS (Action from ADMT6)	P Gros	End 2006	Completed Mid March 07

21	On GTS when PSAL is missing in a triplet, replace it by / and transmit T and Depth	T Carval for Coriolis A Gronell T Yoshida	When accepted by MF for Coriolis End 2006 for Australia and Japan	Jma 21 Nov 06 CSIRO Done AOML 21 Mar 07 Done BODC Done Coriolis not done yet because Meteo-France still refuse them
22	In GTS directory, if we know that the dac has been sending pressure instead of depth, not do the depth to pressure conversion	T Carval C Sun	ADMT 8	A proposal will be made By SP to suppress this directory from the DAC directory
23	Finalize the standard test dataset and send it to Dac managers together with the updated QC manual (Maximum pressure and density tests)	C Coatanoan & T Carval	End November 2006	Done Report to be send mid July
24	Dac managers to test their QC procedure and correct it if necessary	Dac Managers	End January 2007	JMA done AOML done CSIRO Done Coriolis done MEDS Done UK Done India Done CSIO? KMA? KORDI?
25	RT working group to investigate automatic QC procedure could be improved bottom spike	A Gronell to coordinate	ADMT 8	Proposal made by CSIRO
	Delayed-Mode QC Actions			
26	Coriolis to test OW software against BS in North Atlantic	C Coatanoan	AST8	Done
27	Dacs to implement persistence of the last delayed mode offset in RT as well as on the cycles in between the last cycle processed in DM and the present one	Dac managers	AST8	Jma May 07 Incois August Coriolis June 2007 BODC Planned later this summer At present no offset to apply CSIRO : Stay on they own correction CSIO ??? AOML Applied in RT both at GDAC(22 Mar)

				and GTS (27 Mar) , Start 17th Dec for past profiles KMA: No offset to apply yet MEDS done
28	G Johnson to clearly define the sensor information needed in metadata for Thermal mass correction	G Johnson	End 2006	Close see email on the 28th November 2006
28b	J Gilson to see if applying the thermal mass correction in RT will reduce the number of good points rejected by the automatic QC tests (spikes and density inversion)	J Gilson	AST8	Report provided end July and posted on ADMT8 WWW site
29	AIC to identify the float without DM operators	M Belbeoch	AST8	See monthly reports. (DM data monitored for each floats) and AIC WWW Arc to make proposal to process the orphan floats Done at ARC-1 meeting
30	GDAC to implement a DFile checker according to Annie Wong's specification that will reject non conform files	M Ignaszewski	AST8	Annie sent the specification to Mark. Implementation to be done
	Reference Dataset Actions			
31	Coriolis to set up links to the Baseline Reference Databases defined in DMQC2 report	C Coatanoan	End 2006	Completed http://www.coriolis.eu.org/cdc/dmqc_reference_db.htm
32	Jamstec and WHOI to provide SeHyd IOBH and ATL_Hydrobase in non-interpolated format for OW software	Jamstec and WHOI	ASAP	Done
33	Coriolis to update these baselines DB with WOD2005 + CCHDO and provide it as a unique reference DB	C Coatanoan	June 2007	Started but will be available later in 2007
34	Coriolis to set up a yearly basis update of the DB as well as a version control identification	C Coatanoan	ADMT 8	A proposal will be made at ADMT8
35	CCHDO and NODC-USA to ensure that CDT needed by ARGO and submitted to NODC-USA by national NODCs will be transmitted to Coriolis for reference DB updating	C Sun to coordinate	ADMT 8	Started . Status to be provided by CCHDO and NODC-US

	Format Actions			
36	Format group to propose a solution to store Apex_Up and Apex_down metadata	Format group	ASAP	????
37	User manual to be modified to includes the delayed mode parameters for trajectory	B King and T Carval	January 2007	Postponed until the velocity product validation by AST
38	Format group to propose an update of metadata file to be able to handle the new information needed for Thermal mass correction	T Carval to coordinate	AST8	????
39	T Carval to update manual to explain how to handle change in metadata with iridium or Argos3	T Carval	End 2006	Done
40	Canada and Japan to provide their tool to convert netcdf to BUFR	Y Takashi A Tran	ASAP	Jma March 07
41	Table 14 for technical name parameter to be finalize and included in user manual	A Gronell C Schmid S Le Reste	End 2006	Proposal sent 19th June To be discussed and if agreed applied in action 42
42	Dacs to resubmit their technical files in one batch	DAC	ASAP after action 42 closed	After ADMT8
	ARC			
43	ARC to set up consistency check over a basin at least in prototype mode	ARC managers	ADMT 8	SA-ARC: done on prototype mode NA-ARC: done on prototype mode PARC done by JAmstec To be discussed at ARC meeting in Hobart
	GADR			
44	Put on an FTP site an image of the DVD for individual ARC to be able to burn on demand their own DVD	C Sun	End 2006	Close 20Th November 2006

17. Annex 4 : 8th ADMT 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	
2	Establish an Argo user mailing list and a subscription form for Argo to notify users rapidly	End 2007	AIC	
3	Provide to AST chairs the list of operators that notify with delay their floats	End 2007	AIC	
4	Include in AIC report the suspicious floats/profile detected by John Gilson monitoring tools	AST9	AIC John Gilson	
8	Modify the text attached to support@argo.net to encourage people to use this email to report on data quality	End 2007	AIC	
9	Promote support email on GDAC ARC DAC and GADR and other national www	End 2007		
10	Argo forum to be set up by AIC	AST9	AIC T Tchen	
	Trajectory Actions			
11	Brian to provide guideline on how to correct Ascent and Descent Time for APEX and SOLO floats	End 2007	Brian King	
12	Thierry to provide similar guidelines for Provor	End 2007	Thierry Carval	
13	Each Dac to correct its trajectory file according to these guidelines	ASAP	All DACS	
14	Set up format check on trajectory files	ADMT9	Brian King and Mark Ignaszewski	
	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	
16	Hide the GTS directory from the Argo DAC directory and provide a specific	End 2007	Thierry Carval & Mark	

	index for AIC monitoring		Ignaszewski	
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	
18	Automate file removal between the two GDACs	ADMT9	Thierry carval & Mark Ignaszewski	
19	Remove history section from the files in the Latest Data directory. Notify users before !	ASAP	Thierry Carval & Mark Ignaszewski	
20	Study the capability to separate in the latest data directory the new data from the updated ones	ADMT9	Thierry Carval & Mark Ignaszewski	
21	Advertise that at present O2 data are not QCed	End 2007	Thierry Carval & Mark Ignaszewski	
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-Fecb 2008 Start operational March 2008	Mark Ignaszewski DAcs to eventually correct their files	
23	Set up the automated greylist submission	AST9	Mark Ignaszewski	
	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.eq floats Remaining floats from Jamstec, Canada, India	
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	
26	CLS to check why the pressure problem has reappeared	End 2007	Yann Bernard	
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	
28	On GTS , in TESAC message Japan, Australia and Korea to check why occasionally the depth is not increasing;	AST9	JMA KMA	

29	Test the proposed upgrades of tests 8-9-11-14 propose in Christine report	March 2008	AOML Coriolis CSIRO	
30	Update test 6 if the float transmits conductivity set PSAL_QC=4 if TEMP_QC=4	ASAP	All DACs	
31	Update the QC manual	End 2007	Thierry Carval	
32	Investigate the 12 hour offset on Incois data on GTS	ASAP	Incois CLS	
	Delayed-Mode QC Actions			
33	Reduce backlog of Delayed Mode file to less than 20%	ADMT9	All DM operators	
34	Make available the Plots related to DMQC for each float on FTP organized by WMO number	AST9	All DM operators	
35	Program a 3rd DMQC workshop	Sep 2008	Brian King and Annie Wong	
36	Provide an enhance version of OW software	Feb 2008	Annie Wong	
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	
	Reference Dataset Actions			
38	Provide the first version of the Argo Ref DB Argo2008-01	March 2008	Christine Coatanoan	
39	Propose and update procedure for the new CTD coming from ARC, CCHDO and NODC	ADMT9	Christine Coatanoan, Steve Diggs and Tim Boyer	
40	ARC to send the collected CTD to CCHDO either as public or private access data	AST9	All ARCs	
	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	

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	
43	Propose an update procedure for the list of technical parameters when a new one is needed	ADMT9	Ann Gronell	
44	Modify the User manual to take the new technical file format into account.	End 2007	Thierry Carval and Ann Gronell	
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	
46	DAC to update their technical files according to new specification	ADMT9	All dacs	
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	
	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	

18. Annex 5 National Reports

Argo Australia National Data Management Report
ADMT8
13-16 November 2007

Ann Gronell Thresher (CSIRO) and Lisa Cowen (Australian BOM)

During the past year, Australia has deployed 50 Argo floats. We now have 140 active floats from a total of 174 deployments. Deployments were suspended in the middle of the year because we detected two separate problems with the floats. A group of floats had a badly crimped bladder, resulting in leakage. Luckily, this was detected during the surface testing and the floats were not deployed. An additional batch had new programming so the floats would report a profile on deployment with drift average P and T also reported. One group, with a further software revision that included ice detection, had a programming error that resulted in erratic reports from these floats. Four were deployed before the problem was diagnosed. These floats profile on a random schedule, with as much as two months between profiles. We have solved this problem in our subsequent orders by specifying the APF9 controllers for floats that require ice detection. Our engineering team did a great job detecting and diagnosing these problems, thereby minimizing our losses.

CSIRO and BOM funded the complete redevelopment of our real-time processing software; the package (ArgoRT) was installed late in 2006 and has been running successfully since February 2007. This redevelopment was particularly useful for these erratic floats as it does not rely on a 10 day interval for processing data, but accepts profiles whenever they are delivered. We could not handle the volume of data we now receive without this new system.

In April this year, CSIRO hosted the annual Argo Australia meeting in Hobart. The Royal Australian Navy (RAN) has now provided an additional 4 floats this year, continuing their valuable contribution to the Argo Australia program. The HMAS Adelaide has been a tremendous help in undertaking float deployments in regions we usually cannot reach and their contribution is gratefully acknowledged.

Early in 2007, we received a significant funding boost from a new national initiative to provide research infrastructure, the Integrated Marine Observing System, funded by the Australian Government through the National Collaborative Research Infrastructure Strategy. With this funding, we will be able to deploy at least 50 floats per year through 2011.

This year, with some additional funding and forward spending, we will have 88 floats available for deployment. Twelve of these carry oxygen sensors and will be deployed between -35 and -55 degrees latitude to monitor circulation changes in this region. We submitted our order for floats later than usual this year, and consequently most of our floats will not arrive here in time for our Southern Ocean deployments. Many of these will be held until the next Austral Summer. We will spread deployments out over this year and next, depending on opportunities. Our goal will be to fill holes developing in the array around Australia and in the Indian Ocean as older floats disappear.

In addition, many of our new floats will be using the new APF9 controller with Argos transmitters. Dana Swift has been instrumental in getting the software tested and delivered. The University of Bergen has calibrated our oxygen sensors and we hope to have vastly improved oxygen data from these floats as a result. CSIRO has ordered a calibration facility so, in future, we will handle this calibration ourselves.
Table 1 shows a summary of our float performance to date.

Float Status	Number of Floats	Range of Cycles Received before failure
Died from battery failure:	9	101-133
Disappeared on deployment	5	0
Died from grounding or running ashore	8	14-89
Died from Druck pressure sensor failure	1	56 (27 good profiles)
Piston malfunction	1	0
Disappeared without apparent cause	4	40-85
Lost in ice	4	58-67
In ice (still considered active)	(3)	
Probable leak	2	21-49
Still active	140	183+ cycles
Total deployed	174	

Table 1. Float performance and reasons for failure.

Status

- **Data acquired from floats** – All data is acquired from floats when they report.

- **Data issued to GTS** – Data is issued to the GTS immediately after the float data is decoded, QC'd and processed by BOM. Over the past 12 months, 72% of all profiles were delivered to the GTS within 24 hours of the float surface time. There were delivery delays during December and January, due to teething problems with the implementation of ArgoRT, combined with summer holidays.

- **Data issued to GDACs after real-time QC** – Data is sent to both GDACs as soon as the data is decoded, QC'd and processed. At present, both CSIRO and BOM are submitting the data to the GDACS as backup for each other. This ensures that the data is delivered without delay if one of our systems fails. Trajectory files are now being generated though older (dead) floats remain a problem. Once we are assured that our trajectory files are being correctly prepared, we will re-process all floats so they hold the most accurate information.

- **Data issued for delayed QC** – Data is available for delayed mode QC immediately.

- **Delayed data sent to GDACs** - As of 8 October 2007, 57.8% of all our profiles have been submitted to the GDACs in delayed mode. This represents 72.7% of the profiles that are old enough to be considered for DM correction. The

remaining profiles are the ones that are more difficult to process and require more effort; we are working through them now. Further details are included in a separate report.

- **Web pages** – The Argo Australia web pages are updated with the most recent data during the real-time processing of the floats. They are therefore up to date as soon as float data is received. Web pages for each of our floats can be found at: http://www.imos.org.au/facilities/argo-australia.html - follow the link "Track Australian Argo floats".

- **Argo data usage** – Argo data is downloaded to a local mirror at CSIRO once a week. It is then converted to a Matlab format with an index table to help users find the data they need. The data is being used with other data from the GTS to inform the Bureau of Meteorology's Seasonal Climate Outlook and is used in a dynamical climate forecast system (POAMA: http://www.bom.gov.au/bmrc/ocean/JAFOOS/POAMA/index.htm). As part of this the data are ingested into the BMRC Ocean Analysis (http://www.bom.gov.au/bmrc/ocean/results/climocan.htm)
  Argo data is also being used in the BLUElink ocean forecasting system (http://www.bom.gov.au/oceanography/forecasts/index.shtml).
  We are also incorporating it as a high quality background data field for our upper ocean temperature QC programs.
  Research use is rapidly increasing with uses from eddy studies, mixed layer studies, global sea level and heat content analyses and many more.
  These research projects using Argo data and products include:
  • *Determining the ongoing rate of ocean warming and ocean thermal expansion* – Domingues, Church, White and Wijffels, CSIRO.
  • *Global Ocean Temperature Trends* – Wijffels and Feng, CSIRO.
  • *BLUElink Ocean Prediction* – BLUElink Team lead by David Griffin, CSIRO.
  • *Mixed-layer Structure and Biogeochemistry in Australia's Sub-Antarctic Zone* – Tom Trull and Brian Griffiths, CSIRO.
  • *Ecosystem Modelling* – Beth Fulton, Scott Condie, Donna Hayes, Eric Grist, Penny Johnson, Randall Gray and Roger Scott, CSIRO.
  • *Ecocspace modelling applications* – Cathy Bulman, CSIRO.
  • *Water mass changes comparing Argo and Repeat Hydrographic Sections* – Bernadette Sloyan, CSIRO.
  • *Seasonal climate prediction for Australia and the Pacific Island countries* – Neil Plummer, Bureau of Meteorology.
  •. *Ocean oxygen changes* – Bronte Tilbrook, CSIRO.

  PhD Projects:
  • *Determining changes in global ocean water mass properties with inferences for changes in air sea fluxes of heat and water*.
  Kieran Helm, University of Tasmania.

- *Long-term Salinity Changes and its Relationships to Atmospheric Forcing*. Paul Durack, University of Tasmania.
- *Southern Ocean water mass changes*. Laura Borreguero, University of Tasmania

DMQC Report 2007 - Argo Australia

1. Status: counts based on USGODAE, 8 Oct 2007:

(1) DM profiles:	6571
(2) RT profiles:	4796
(3) profiles older than 6months:	9048

DM ratios:

- all profiles (ratio (1) to (1)+(2)): 57.81%
- eligible only (ratio (1) to (3)): 72.67%

2. DMQC process

We used a four-step approach to conduct the DMQC work:

1. Manual inspection and de-spiking, including:
    - de-spiking
    - scrutinising QC-flags assigned by RT tests
    - comparing psal with reference climatologies
2. Application of sensor thermal-lag correction,
3. Drift assessment,
4. Final visual check.

2.1 Manual inspection and de-spiking

- De-spiking is done via Gilson's GUI. Suspicious data-points are assigned appropriate QC-flags.

- As the QC flags assigned by the RT tests are not always reliable, they are inspected and changed where appropriate on the raw record fields.

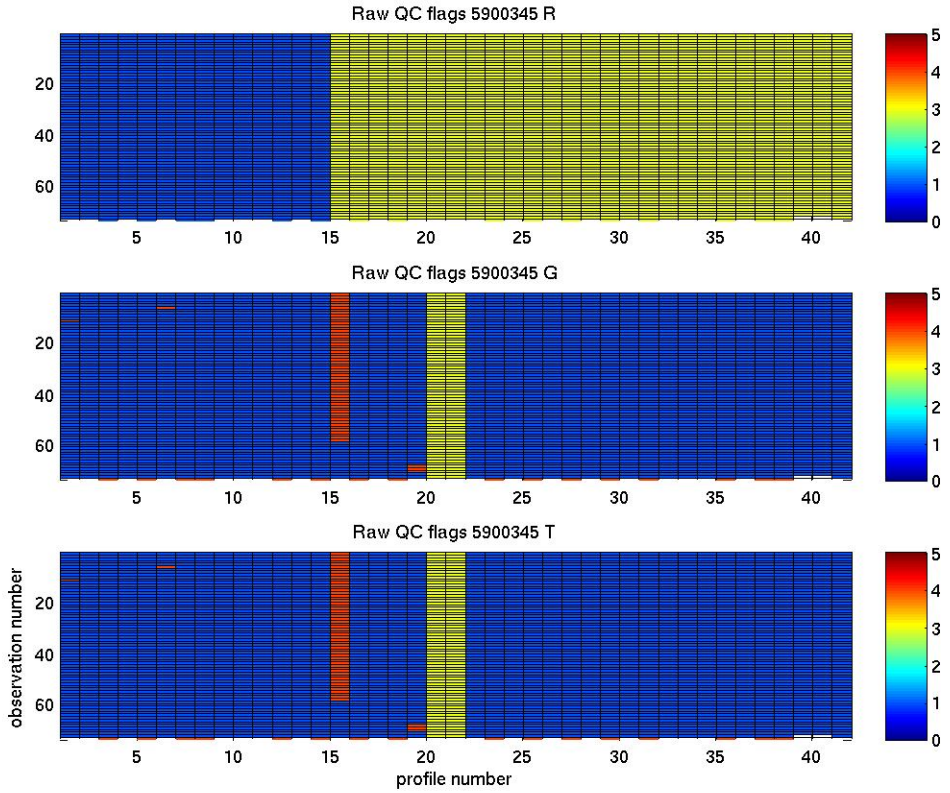

Figure 1. In this example, the RT tests assigned to profiles from 15 to last a QC-flag of 3 ("potentially correctable bad data"). The QC-flags re-inspection lead to re-assigning profile 15's QC-flag to 4 ("bad") and profiles 16-19 and profiles 22-last's to 1 ("good") (R refers to raw data, G to QC-flags rectified data and T to thermal-lag corrected data).

2.2. Application of sensor thermal-lag correction.

- We applied the correction for thermal mass error according to G Johnson et al (2007). The correction was applied only to Apex floats where the coefficients alpha and tau were available. Palace and Provor received no correction for thermal mass error.

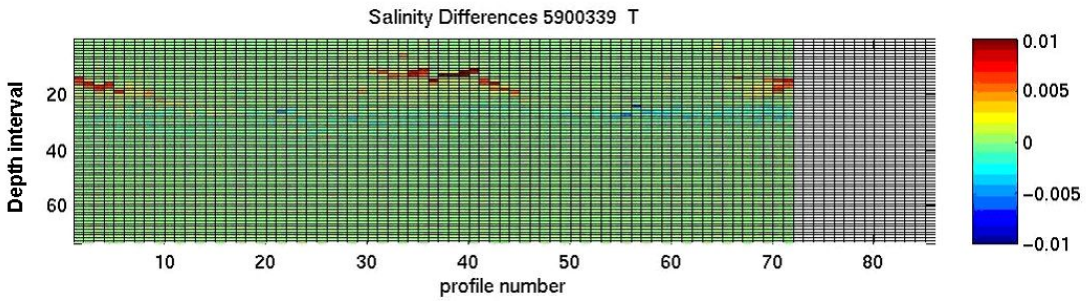

Figure 2. Salinity differences after thermal-lag correction.

- We also applied a correction to salinity for drift in the pressure sensor using the CSIRO seawater routines. This correction was applied to PALACE and APEX data.

  Where the parameter surface pressure-offset (see section 3.2) was missing, the values of the paramater were interpolated between adjacent values.

2.3. Salinity Drift Assessment.

- We have adapted WJO v2 to fit the characteristics of our regions of interest. To minimise the effects of upper ocean variability and poor statistics due to a sparse historical data set, we restricted the mapping to the deepest potential temperature levels, typically 3ºC and cooler. We use the Indian Ocean Hydrobase (Kobayashi et al, 2006) merged with the WOD subset (supplied by WJO) outside of the Indian Ocean.

- When assessing the suggested adjustments derived from WJO processing, we use two additional climatologies to derive climatology/float differences:
  - CSIRO's Atlas of Regional Seas (CARS – Ridgway et al, 2002).
  - The WOCE climatology (Gouretski & Koltermann, 2004)

  In the following example (5900039), the joint examination of WJO-based adjustments (Figure 3) and climatologies (Figure 4) lead to the decision to reject WJO adjustments and errors from cycles 1 to 140 and to manually deal with cycle 93's adjustments.

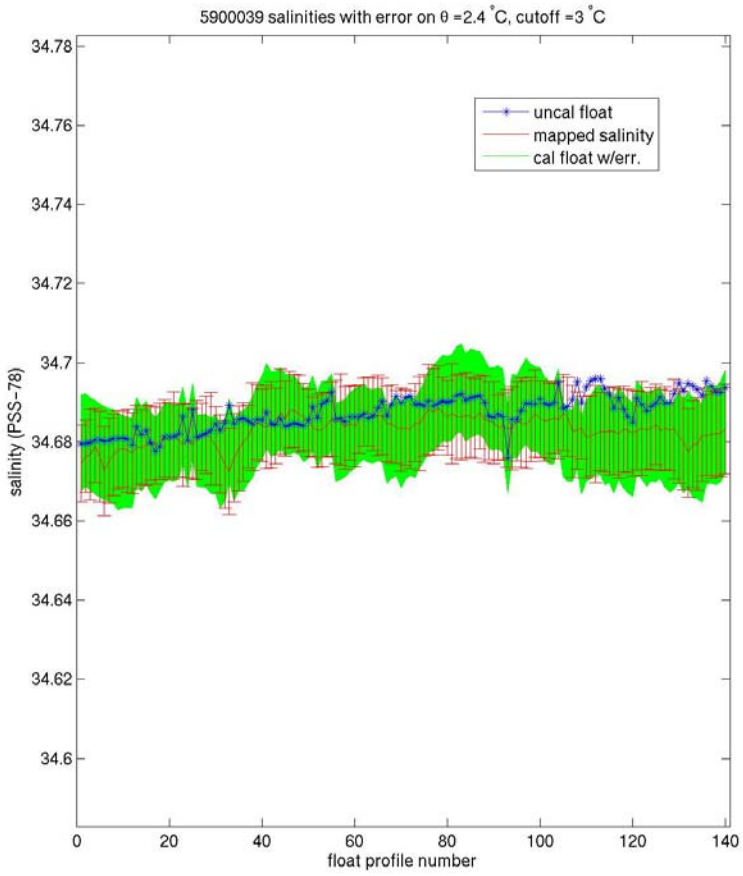

Figure 3. WJO adjustments

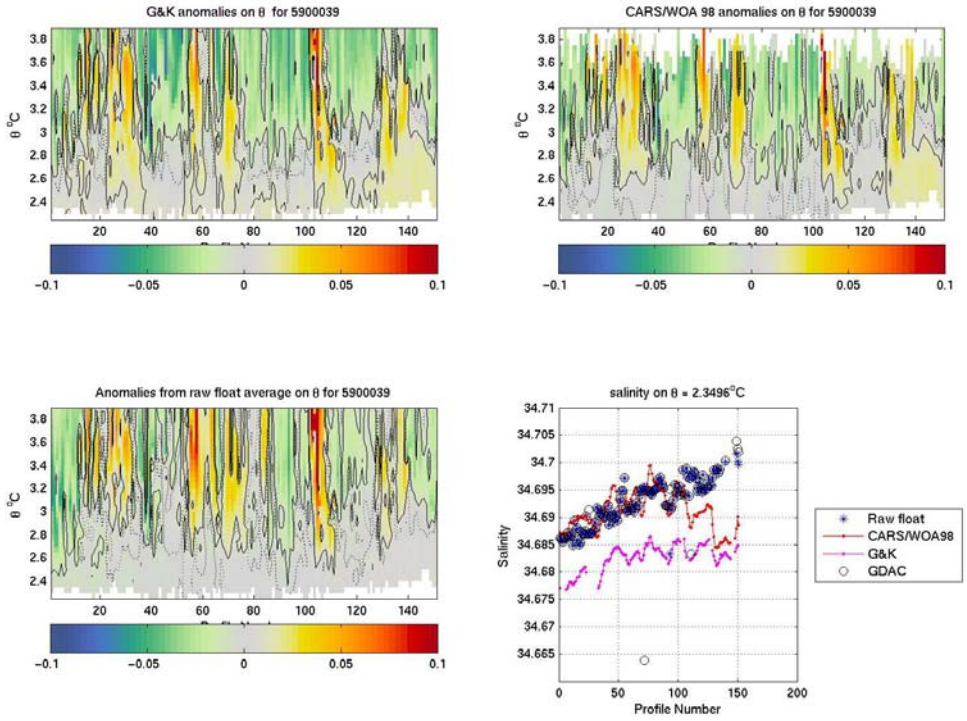

Figure 4. Comparison charts with CARS and G&K climatologies

- In addition, we also plot the theta-S relationship of the candidate float with nearby Argo floats, to help confirm drift estimates. We aim to include floats that pass 'Gilson's Rules' into our background fields for WJO suggestions soon.

- We have developed software tools for handling the imbedding of the adjustment data and the historical information into the NetCDF profiles. Some of these tools implemented an Excel interface in order to reduce input errors, allow adjustments to be clearly inspected and to increase processing efficiency.

- At the end of each step, we conducted a data consistency check using visual plots to ensure that there is no discrepancies in the processed data (Figure 5).

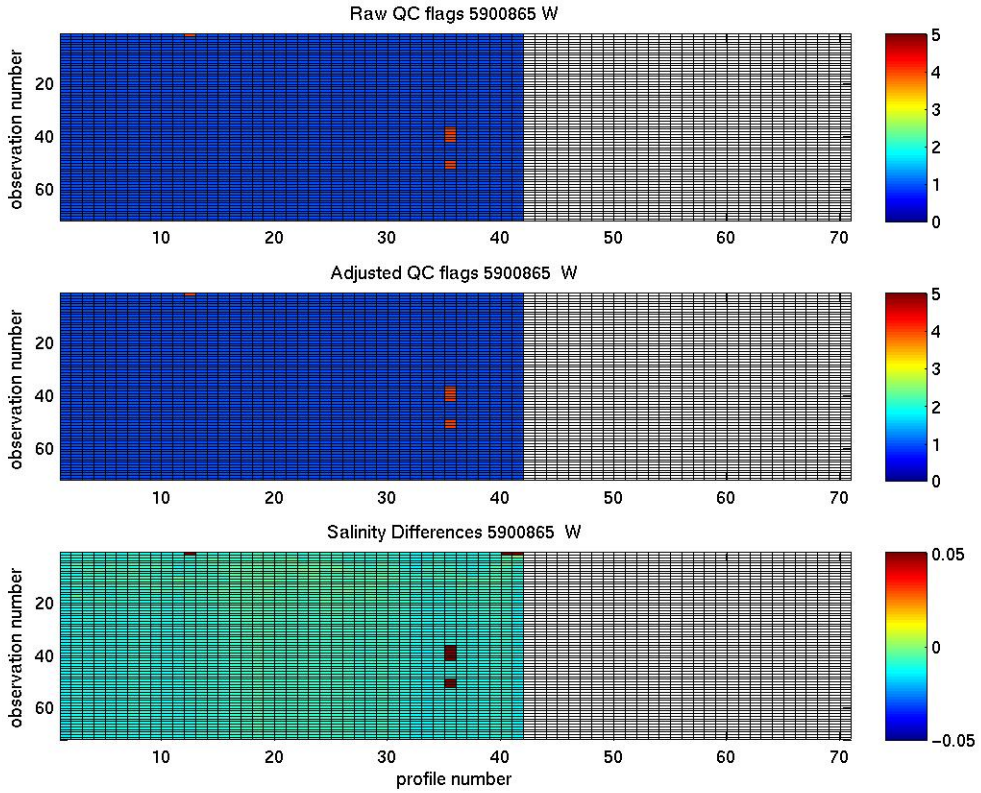

Figure 5. Visual verification plots.

2.4. **Final visual check**.

Before submission to the GDACs, the profiles are checked for:

- consistency between the phases of processing (visual plots of QC flags, raw – adjusted salinity changes)
- the adjusted data are loaded as a last check into Gilson's GUI for final inspection.

3. Problems encountered of interest:

3.1 Float type variation:

The type of probes CSIRO has deployed over time include three types as follow, ranked by frequency order:

- Apex (171). NB: all our new floats are of Apex type
- this group includes 10 older Palace floats
- Provor (3)

The software, in particular for conductivity cell thermal lag adjustment, was adapted to take account of the variation in float types.

3.2. Surface pressure-offset:

Apex floats are programmed to shut down their CTDs at a set near-surface depth. This set-depth is expressed in units of pressure (typically 5 dbars) and has received various denominations with slight variations such as “SURFACE_PRESSURE_(DBAR)”, “SURFACE_PRESSURE(db)”’or “PRESSURE_SENSOR_OFFSET(db)”.

As software dealing with NetCDF files relies on exact string-matching for extracting any specific technical parameter, it is important that a consistent name be given to technical parameters. We have decided to adopt uniformly the later denomination “PRESSURE_SENSOR_OFFSET(db)” as being less ambiguous than the others. CSIRO and AOML are making a proposal for a unified nomenclature for all technical parameters. The proposal will be discussed at the ADMT 8.

3.3. Floats with oxygen sensor

We have deployed a total of 6 floats equipped with sensor for dissolved oxygen.

However, we do not have currently a defined scheme for calibrating DOXY data. We are interested in knowing what the other groups are doing for oxygen QC.

3.4 Further problems encountered in delayed mode processing:

" Bad values or missing data in surface pressure offset field
" Real time software flagging good data as bad (rare problem and new software has addressed this issue)
" Difficult floats involving dodgy pressure or temperature sensors where data is probably not recoverable
" In some cases the WJO software cannot adequately correct the sensor drift and in these cases a manual offset must be calculated and applied. This can be automated to some degree but still requires significant manual interpretation and hence takes extra time to process
" With floats deployed in highly variable regions there can be significant difficulty in separating sensor drift from real oceanographic variability. In these cases, ancillary information from nearby argo floats or from historical CTD data can be useful but this can be a time consuming process.
" Fouling of the sensors occasionally affects the salinities of one or two profiles which then require individual manual adjustment. This correction can't really be automated.
" Ongoing software development has automated and streamlined the DMQC process to a large extent but this does require time consuming testing in the initial phases

and also continual updating to deal with anomalous floats and profiles. This has taken a large amount of DMQC time.

" Occasional corruption occurs of latitude/longitude data or day/time stamps which are not detected till DMQC processing begins. These then need to be corrected in the real time files and the data re-processed.

References

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Argo National Data Management Report for Canada – 2007

1. Status

Data acquired from floats: Currently we are tracking 109 floats. Of these, 4 may be in trouble or may have failed. We are tracking 11 floats with Aanderaa but without Optode sensors, 4 floats with Aanderaa and Optode sensors, and 24 floats with pressure activation and deep profile first (DPF) feature. Oxygen data currently haven't quality controlled in real-time. Floats which experience salinity drifts based on delayed mode quality control are corrected in real-time before sending to GTS and GDACs

Data issue to GTS: All of the data are issue to the GTS. On average 75% of data are issued to the GTS within 24 hours of the float reporting. Longer delays are usually caused by in-house network connections, having troubles of remaining connected to the Argos server for downloading the data, and by incomplete sets of message received from the float. However all of the delayed data are issued to the GTS and GDACs

Data issued to GDACs after real-time QC: We are sending trajectory, profile, technical and Meta files to the GDACs on the same schedule as they are issued to the GTS.

Data issued fro delayed QC: We send data to the PI on the same schedule as the data are issued to the GTS

Delayed data sent to GDACs: The PI send us "D" files after he has quality controlled the data. At this point we have data quality controlled data up to January 2007. We have sent approximately 3870 delayed mode quality control profiles to GDACs at the end of October 2007. We have roughly 2 months worth of profiles ready for delayed mode quality control at this time.

Web pages: We maintain pages that show float tracks, and all of the data collected for all of the Canadian floats. Both real-time and delayed mode data are also available to download, but we alert viewers that the official version resides at the GDACs. Pages are updated daily.

We also show some information about the global programme including the position of floats over the previous months, the success rate of meeting the 24 hours target for getting data to the GTS at various GTS insertion points, the number of messages transmitted, report of floats that distributed more than one TESAC in 60 hours and the statistic of Canadian float performance.

Readers may go to:
http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog_Int/Argo/ArgoHome_e.html
for more information

Statistics of Argo data usage: We currently have three PIs. Argo data have been used to generate monthly maps and anomaly maps of temperature, salinity along line P in the

Gulf of Alaska. Line P has been sampled for 50 years and has good control on monthly climatology. For more information, you can go to:
http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/argo/LineP_e.htm

2. Delayed Mode Qc

Ron Perkin (was at IOS, now retired) handled delayed mode quality control processing for all of the Canadian floats. Mathieu Ouellet has been trained to do future delayed mode quality control for profiles collected after Jan 2007.

3. GDAC Functions

Canada forwards TESAC data to the GDAC in Brest three times a week. We also forward TESAC and CTD data to NODC.

4. Regional Centre Function

Canada has no regional center function.

Argo National Data Management Report 2007
The 8th Argo Data Management Team Meeting

1. Status

The China DAC has processed data from 30 Argo floats including 10 active floats as of October 17, 2007. More floats will be deployed in the coming years by different PIs. The DAC is acquiring ARGOS messages from all the active floats in real-time. Over 300 TS profiles from those floats are sent to GDACs in netCDF format after real-time QC, and issued to GTS by CLS, in 2007. The China DAC applied WJO DMQC to Chinese floats. 1534 DMQCed profiles have been sent to GDACs as of October 17, 2007.

The China Argo Data Center and China Real-time Data Center established websites (http://www. argo.gov.cn and http://www.argo.org.cn) both in Chinese and English language. The former provides access to the global Argo profiles data, meta data, trajectory data and deployment information from the Argo Continuously Managed Database. The users are able to access to the data conveniently on the website including netCDF raw data, near real-time data, meta data, trajectory data, delayed-mode data and download Argo data via FTP. China Real-time Data Center's website shows the status of Chinese floats including TS profiles and trajectories. The global Argo data are available to users via FTP.

A new National Basic Research Program of China, "Research on upper ocean structure, variability and prediction based on Argo global real-time ocean observing system" (2007-2011) has been granted. This research program will use Argo data broadly on the aspect of data assimilation, multi-source data reanalysis, thermohaline exchanges, the temperature structure and variability of the upper ocean. Institute of Atmospheric Physics (Chinese Academy of Sciences) has developed a 3-D Ocean Variational Analysis System (OVALS) using Argo and other observing profiles.

2. Delayed Mode QC

The China DAC applied WJO tool for salinity adjustment. Until now, 4 among 30 Argo floats have been found obvious sensor drift or offset and 1534 Dfiles, which represents 90% of all our profiles have been updated into GDACs. The thermal mass correction has been applied to some of the APEX profilers in 2007. As the increase of the number of floats in the coming years, the main difficulties to be encountered is lack of manpower for DMQC, however, we will try to conduct DMQC routinely.

3. Products

In order to expand the use of Argo data, China Argo Data Center also provide many products of Argo data, such as waterfall maps, Argo trajectory maps, global surface current and mid depth current maps which are derived from Argo trajectory data.

China Argo Data Center has provided six versions data DVD to more than 400 users or institutes which promote the usage of Argo data .

Argo National Data Management Report

DUTCH ARGO

1. Status
(Please report the progress made towards completing the following tasks and if not yet complete, estimate when you expect them to be complete)

- Data acquired from floats

10 floats operating, one dead. Regular data flow, i.e., one profile per 10 days.

- Data issued to GTS

all

- Data issued to GDACs after real-time QC

all (done by CORIOLIS)

- Data issued for delayed QC

none

- Delayed data sent to GDACs

none

- Web pages

http://www.knmi.nl/~sterl/Argo **(dutch only)**

- Statistics of Argo data usage (operational models, scientific applications, number of National Pis…)

n/a

- Products generated from Argo data …

n/a

2. Delayed Mode QC
(Please report on the progress made towards providing delayed mode Argo data, how it's organized and the difficulties encountered and estimate when you expect to be pre-operational .)
nothing done yet. No manpower available.

3. GDAC Functions **-none-**
(If your centre operates a GDAC, report the progress made on the following tasks and if not yet complete, estimate when you expect them to be complete)

- National centres reporting to you
- Operations of the ftp server
- Operations of the www server
- Data synchronization
- Statistics of Argo data usage : Ftp and WWW access, characterization of users (countries, field of interest : operational models, scientific applications) …

4. Regional Centre Functions **-none-**

(If your centre operates a regional centre, report the functions performed, and in planning)

Argo data management
October 20, 2007
Ref : cordo-rap/07-184
Version 1.1

ARGO DATA MANAGEMENT REPORT

FRENCH DAC FOR 2007

Introduction

This document is the annual report of the French Argo Data Assembly Centre (DAC) for 2007.

The French DAC is supported by the Coriolis project , a joint project for operational oceanography.

1. Status of the DAC

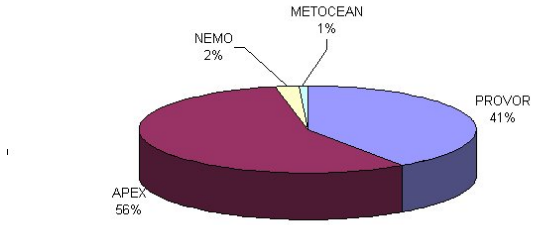
	Active floats	*Active + Inactive floats*
Apex	173	380
Provor	141	356
Nemo	11	24
Metocean	5	15
Total	333	775

- Data collected from floats include
  - 57613 profile files including 26047delayed mode profiles
  - 771 trajectory files
  - 771 technical data files
  - 777 meta-data files

- The Coriolis Argo DAC acts as a DAC for French floats and for 11 other countries

Active/Total		*PROVOR*	*APEX*	*NEMO*	*METOCEAN*	*TOTAL*
France	Goodhope	26/48				26/48
	Cirene	10/22				10/22
	Congas	2/11	25/27			27/38
	Egypt	7/14				7/14
	ETO_BB	0/16	1/3			1/19
	FLOPS	7/7				7/7
	Flostral	0/30				0/30

	Frontalis	17/20				17/20
	Ovide	14/16				14/16
	Pomme	0/22				0/22
Germany	Argo_Awi		1/28	4/6		5/34
	Argo_Greenland		0/5			0/5
	BSH		49/71	3/3		52/74
	CICIO		1/5			1/5
	Clivar Marine program		0/20			0/20
	IFM2	1/1	0/5			1/6
	IFM Geomar		22/24	0/2		22/26
	SBF 460		1/13			1/13
	Tropat		9/15			9/15
	Wen		26/36			26/36
	Weccon		0/22	3/4		3/26
Korea	Kordi (part of overall project)	3/5	4/8		4/5	11/23
Chile			6/6			6/6
Costa Rica		1/2				1/2
Spain		0/2	8/8			2/10
China		0/1				0/1
Netherlands		3/4	7/7			10/11
Mexico		1/1				1/1
Norway			6/11			6/11
Russia	Meridian GoodHope	0/2				0/2
European Union	MFSTEP	1/12	7/16			8/28
	Gyroscope	0/37	0/47			0/84
Total		/278	/387	/15	/5	

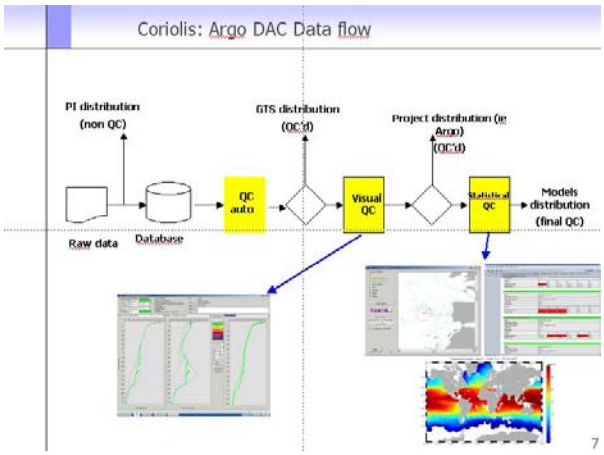


Percentage of the various categories of floats processed by Coriolis as DAC

During the past year, in coordination with CLS Argos we have processed Apex 28 bits format floats which are not hosted by a national DAC.
We also quality control the data circulating on GTS from floats with no national DAC.

- Data issued to GTS

All data processed by Coriolis are distributed on the GTS by the way of Meteo-France. This operation is now automatically performed. After applying the automatic Argo QC procedure, the Argo profiles are inserted on the GTS every 2 hours. So, Argo profiles are now inserted on the GTS 365 days per year, 24 hours a day.



CORIOLIS DAC: Argo data flow

- Data issued to GDACs after real-time QC

All meta-data, profiles and trajectory data are sent to Coriolis and US-Godae GDACs. This distribution is automated.

Technical data are regularly issued to the GDACs

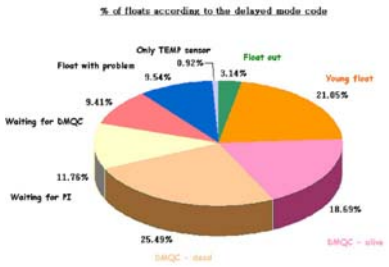
- Data issued for delayed QC

All profile files are sent to PIs for delayed QC. Most of the Atlantic data handled by Coriolis are checked by the European project Mersea.

- Delayed data sent to GDACs

Since spring 2007, the delayed mode data processing performed at Coriolis is the new software OW (merge of Annie Wong and Lars Boehme methods).

A total of 26047 (to be compared to the 22501 profiles processed in september 2007) delayed mode profiles was sent to the GDAC.



Status of the floats processed by Coriolis as DAC

A separate document reporting the DAC Coriolis activity related to the delayed mode data processing is available.

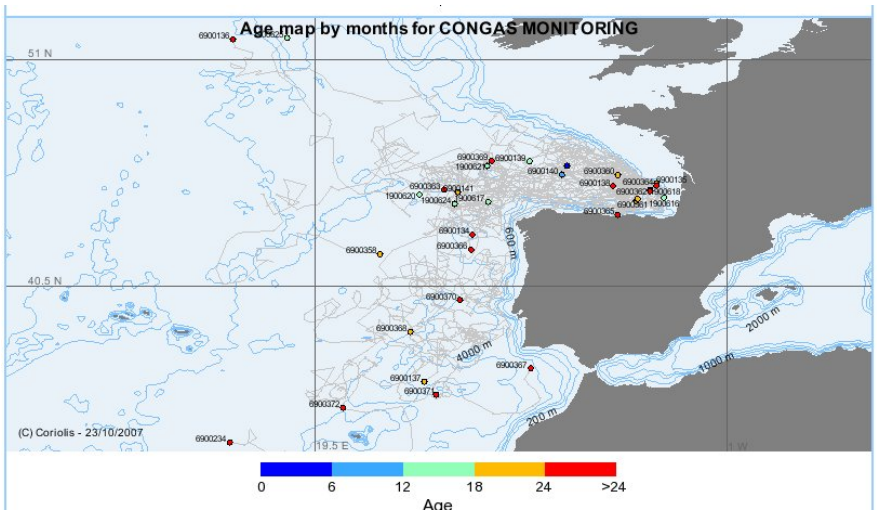
- Web pages

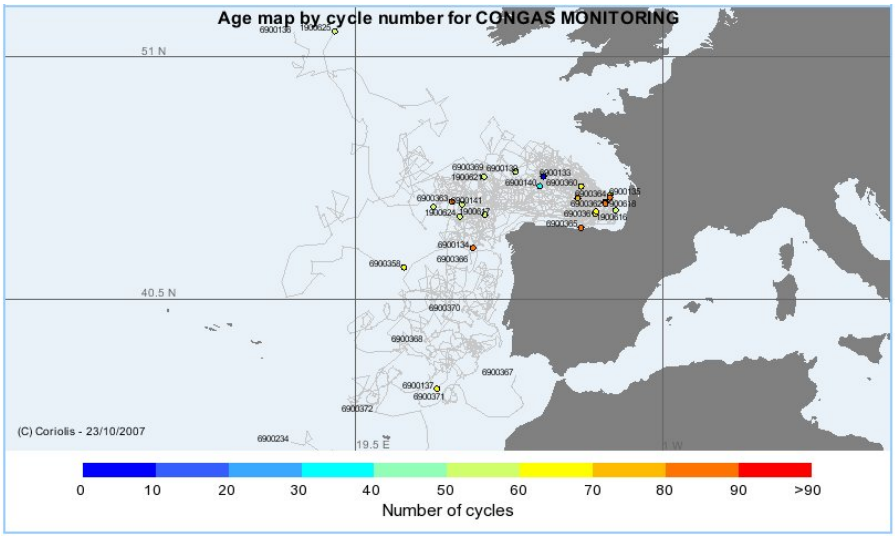
The web site of the French DAC is available at : http://www.coriolis.eu.org/cdc/

It provides :

- Individual float description and status (meta-data, geographic map, graphics : section, overlayed, waterfall, t/s charts)
- Individual float data (profiles, trajectories)
- FTP access
- Data selection tool
- Global geographic maps
- Weekly North Atlantic analyses (combines Argo data and other measurements from xbt, ctd, moorings, buoys)
- Some animations

The Coriolis web site can also display geographic maps in order to monitor the floats status: http://www.coriolis.eu.org/cdc/coriolis_floats_monitoring.htm

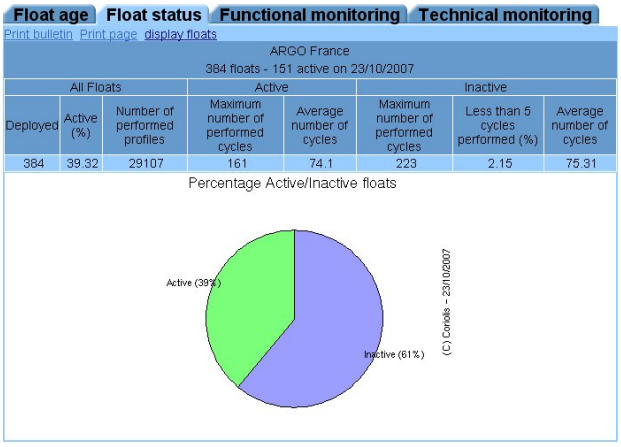




These maps display the ages of the floats deployed in one of the French Argo projects

2. French contribution to floats deployment

The following paragraph describes the contribution of France to floats deployment. It is is included in the overall description of the DAC activity which is reported below.

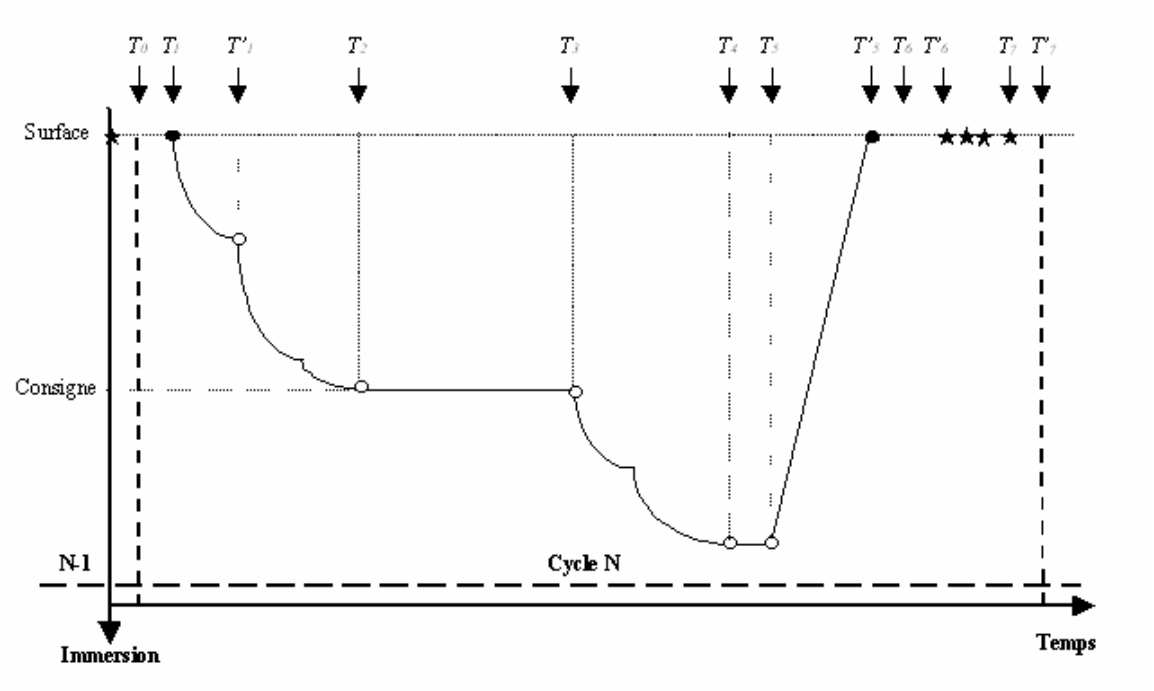


3. Trajectory studies

Since January 2007, a study on trajectories of the floats managed by the French DAC is underway.
The objective of the study is to have a better estimate of underwater movements for Provor and Apex floats (95% of the floats managed by the French DAC).
For Provor floats, there are 7 families of floats[1], with 13 format versions.
For Apex floats, we handle 22 format versions.
The first step of the study is to detect and clean out anomalies on trajectory and technical data, for each floats format versions.
This first step pointed out several anomalies on Provor CTS3, Provor CTS2, Apex 4 and 11 (incorrect cycle numbers, timings, missing informations). The trajectory files for these floats were recalculated and submitted to GDAC (297 floats).
The task of trajectory anomaly corrections is still going on for other versions of Provor and Apex float (439 floats).

The second step of the study is based on the recalculated trajectories. Its objective is to estimate deep-sea currents from float movements. This second step is still going on.

[1] Provor-T, Provor CTF-1, Provor CTF-2, Provor CTS-1, Provor CTS-2, Provor CTS-3, Provor PNG



The Coriolis trajectory survey will improve the accuracy of calculations and estimates of floats times and locations.

Report Delayed Mode Quality Control at the Coriolis Data Center

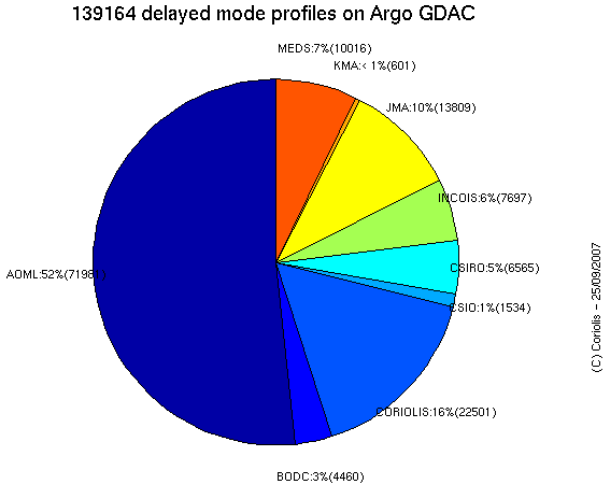
1. State of the delayed mode quality control at the Coriolis data center on 25th September 2007 :

We are finalizing the Delayed mode QC with some French PIs.

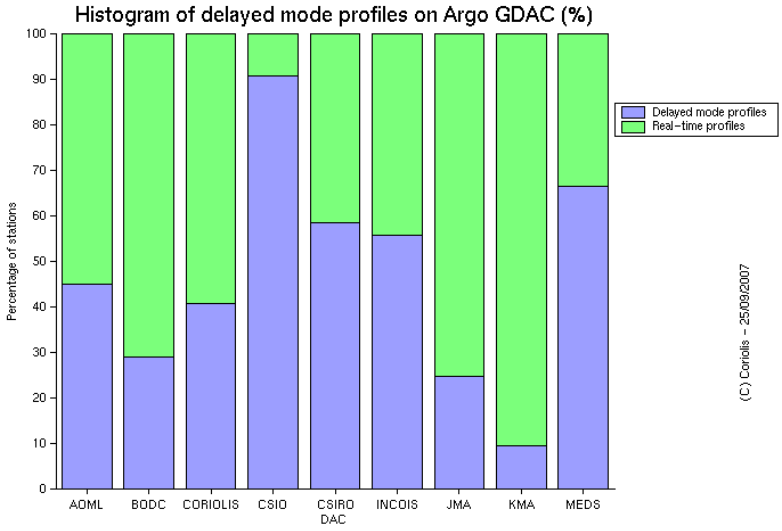
Since the 10th September till now, 3157 profiles have been submitted in both GDACs.

The last profiles with only TEMPERATURE data will be also submitted before the end of this week (week 39).

At present, we have 22501 profiles in delayed mode at the Coriolis data center, corresponding to 16% of the delayed mode profiles on Argo GDAC.

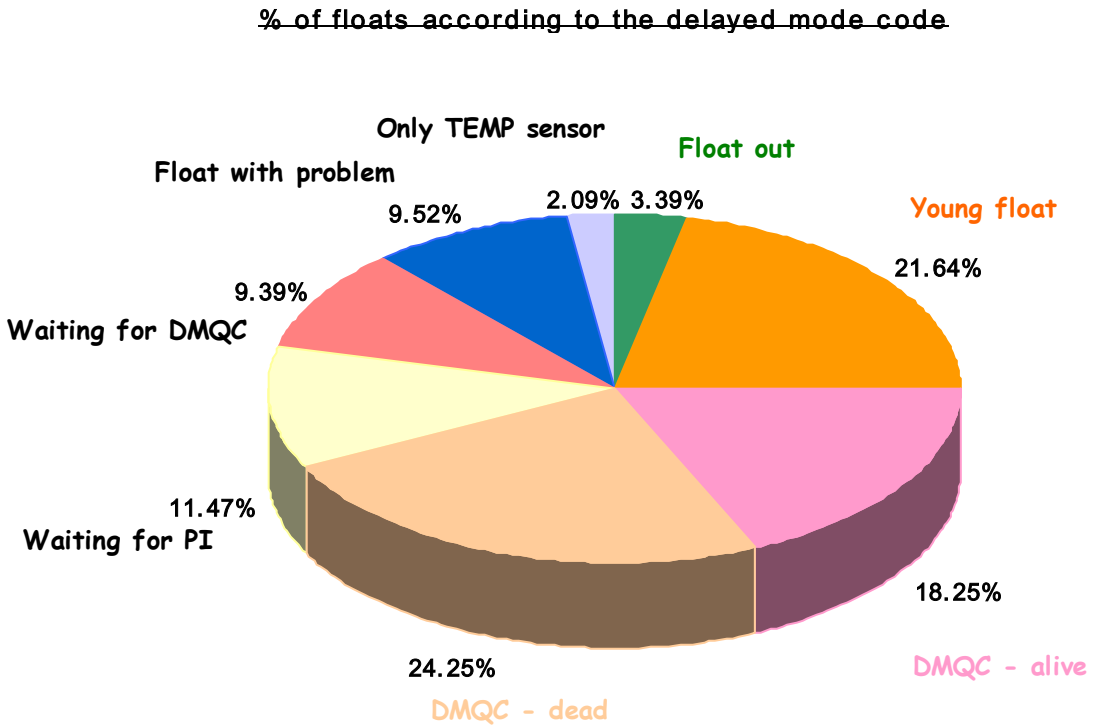


Looking at the histogram of profiles done in delayed mode quality control and profiles still in real-time, we have now more than 40% of Coriolis DAC profiles in delayed mode, including all the floats of the DAC. Taking into account only floats available for the delayed mode, we have 55% of Coriolis DAC floats processed in delayed mode.



Those values will be still updated next week since some profiles have been loaded this week, especially floats with only temperature data.

You will find below a more detailed presentation of the different states of the Delayed Mode quality control process at the Coriolis DAC :



- 2% of floats only have temperature sensor : those profiles will be done in delayed mode before the end of week 39.
- 3.4% are floats (“float out”) which an abnormal number of cycles : just one or two cycles for some floats, or around 10 cycles for others, for one float (4900607) time-series starting with the cycle 39 so how can we know what happened before on data ?. Those profiles for most of them will be done in October.
- 21% are too young (younger than 18 months) to be processed in delayed mode.
- 42% of floats (active and inactive) have been processed in delayed mode QC.
- 11.5% have been sent to PIs and we are waiting for the DMQC correction from them.
- 9.4% have not been processed because we were looking for PI's to validate the corrections : for some of them, we have found a solution: first steps of the DMQC will be done at Coriolis data center and the PIs will be requested to validate the proposed corrections. Some of these floats are luckily to be processed before the end of this year.
- 9.5% are difficult floats that present strange behavior and for which we need to take time to figure out how to process them in delayed mode

2. Difficulties to process delayed mode on Argo floats

Our main problems are/have been :

1- *The reference database*

The reference database was inexistent in South Atlantic and Antarctic Ocean. In Atlantic Equatorial area, the CTD data were not abundant and a first work has been to find recent CTD with French scientists (some teams have done CDT for DMQC activities during the 2006-2007 cruises) .

2- *New software*

The need to switch to OW software in first semester has not been as trivial as planned. After that, we have also spent time training PIs doing themselves the DMQC on their own floats. This is an investment for the future. For few areas, we needed to make some “updates” in the method to run the DMQC. Feedbacks have been sent to Annie Wong.

3- *Circumpolar current area*

The fact is that none of the softwares are optimal on the circumpolar current area.
For some floats in this area, it is difficult to run the software since the mapping scale use data in each side of some fronts (case for the Goodhope floats). How can we improve this ?

4- *PIs to be available for the DMQC*

Most of the floats processed by Coriolis were deployed in collaboration with scientific team that agreed to carry on the DMQC activity. However we have also collaborated with operational teams (ie the French Navy) who is mainly interested in real-time data and for which no man power was planned for DMQC. We have agreed with these team that the Coriolis data center will first run the DMQC on those floats and provide the correction to the PIs for validation.

5- *Floats with only TEMP*

It was decided to “put in touch” some floats having only temperature data. The DMQC on those floats are now processing and a significant number of only Temperature Floats should go thought DMQC very soon. To do this DMQC on TEMPERATURE, we use the results of the objective analysis (if the profile has been in alert with the objective analysis) and visual quality control.

6- *Others*

We also have identified batches of non correctable floats (especially Provor with FSI sensors) that are not correctable that we are about to released as bad data.

Argo Data Management
CLS-DAA-NT-07-1392
Version : 1rev1 of the 9 November 2007
Nomenclature : -

CLS Argo Data Management Report 2007

		COMPANY	DATE	INITIALS
WRITTEN BY	Y. BERNARD	CLS	08/11/07	
CHECKED BY	C. ORTEGA B. WOODWARD	CLS CLS America	09/11/07	
APPROVED BY	C. ORTEGA B. WOODWARD	CLS CLS America	09/11/07	
APPLICATION AUTHORISED BY	M. BELBEOCH	JCOMMOPS	09/11/07	

CLS 8-10 Rue Hermès - Parc Technologique du Canal - 31520 Ramonville St-Agne - FRANCE
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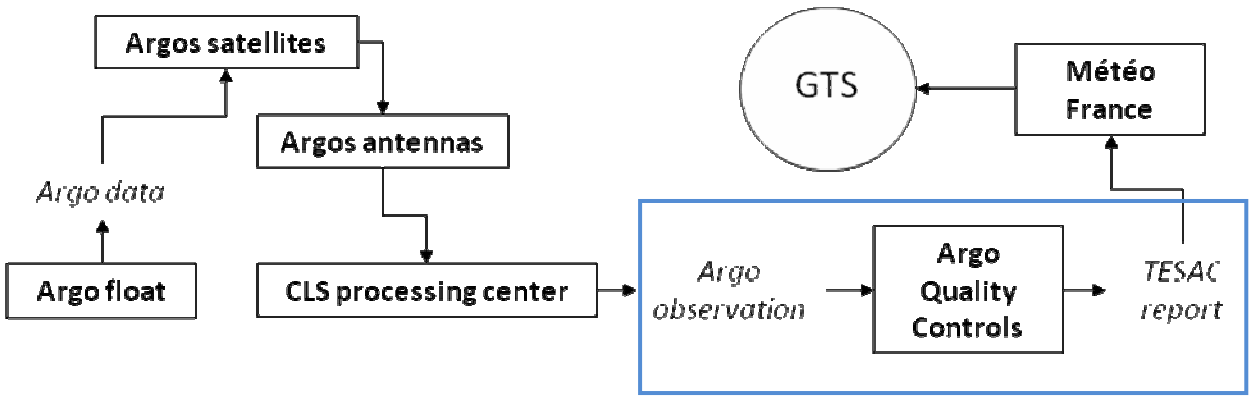
JCOMMOPS	M. BELBEOCH	1
CORIOLIS	S. POULIQUEN	1
CSIRO	A. TRESHER	1
ARGO	Argo Data Management Team	1

1. CONTEXT

The CLS Company, responsible of Argos system, has a DAC (Data Assembly Center) function for Argo programs which do not have real time processing capabilities. This operational (24h/24h on 365 days/year) data processing is a free added value Argos service. Argo data are processed by CLS for GTS distribution both in CLS France and CLS America Incorporation.

CLS America is processing all the U.S. Argo floats (approximately 1,500), these includes 58 Iridium floats. CLS America converts the Argos raw data into a "phy" format (defined by NOAA/AOML) and inserts these files in real-time into the Argo server in CLS America computing center. That server is "operated" by AOML but is "hosted" by CLS America. The approved Argo QC is performed on the server and then GTS bulletins are created and sent via ftp to the NWS (National Weather Service) gateway for dissemination onto the GTS. The details of U.S. floats monitoring are presented in the Argo National Data Management Report of United States provided by AOML.

In CLS (France) data processed by CLS GTS subsystem are sent via ftp to Meteo-France (Toulouse) in TESAC bulletins and then Meteo-France put them on the GTS (Global Telecommunication System). The synoptic below summarizes the Argo data flow since their transmission by the float until their dissemination on the GTS.



CLS (France) GTS subsystem

2. STATUS OF THE CLS (FRANCE) DAC IN OCTOBER 2007

- **Data acquired from floats :**
  - 154 floats were declared in the CLS GTS database
  - 131 instruments were active in this month
  - 124 were disseminated profiles on the GTS
  - 5808 profiles were processed since October 2006 at CLS

- **Description of the 154 floats :** CLS processed in real time floats for Argo program which are not hosted by a national DAC:
  - 95 INCOIS floats,
  - 47 KORDI floats,
  - 10 Argo China floats,
  - 2 Argo Russia floats.
  - All these floats are Webb Apex Research floats with 10 different data formats.

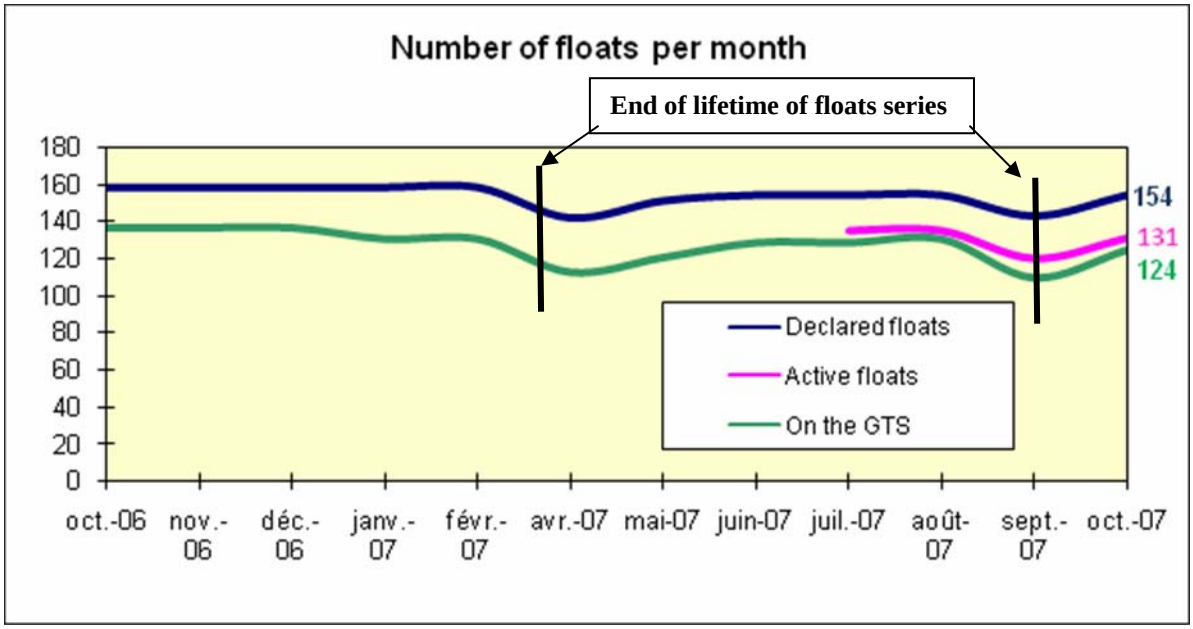
Note: 7 floats which are not put on the GTS in October 2007 were filtered by Meteo-France. This filtering is due to the //// presence in TESAC bulletin when a measure (temperature or salinity) is missing. The CLS TESAC format respects the ADM specifications, Meteo-France should as soon as possible to accept this format (beginning 2008). In October 2007, 28 TESAC bulletins were filtered by Meteo-France for this reason.

- **Data issued to GTS:** All data processed by CLS are distributed on the GTS by way of Meteo-France. This operation is automatically performed and TESAC bulletins are sent to Meteo-France every 10 minutes. Before the encoding in TESAC bulletins, Argo data are filtered by Argo QC procedure. The GTS processing at CLS is operational and in backup with the CLS America (in Largo, Washington) processing center 365 days per year, 24 hours a day.
  - 4884 profiles were relayed onto GTS since October 2007 (source: Meteo-France)

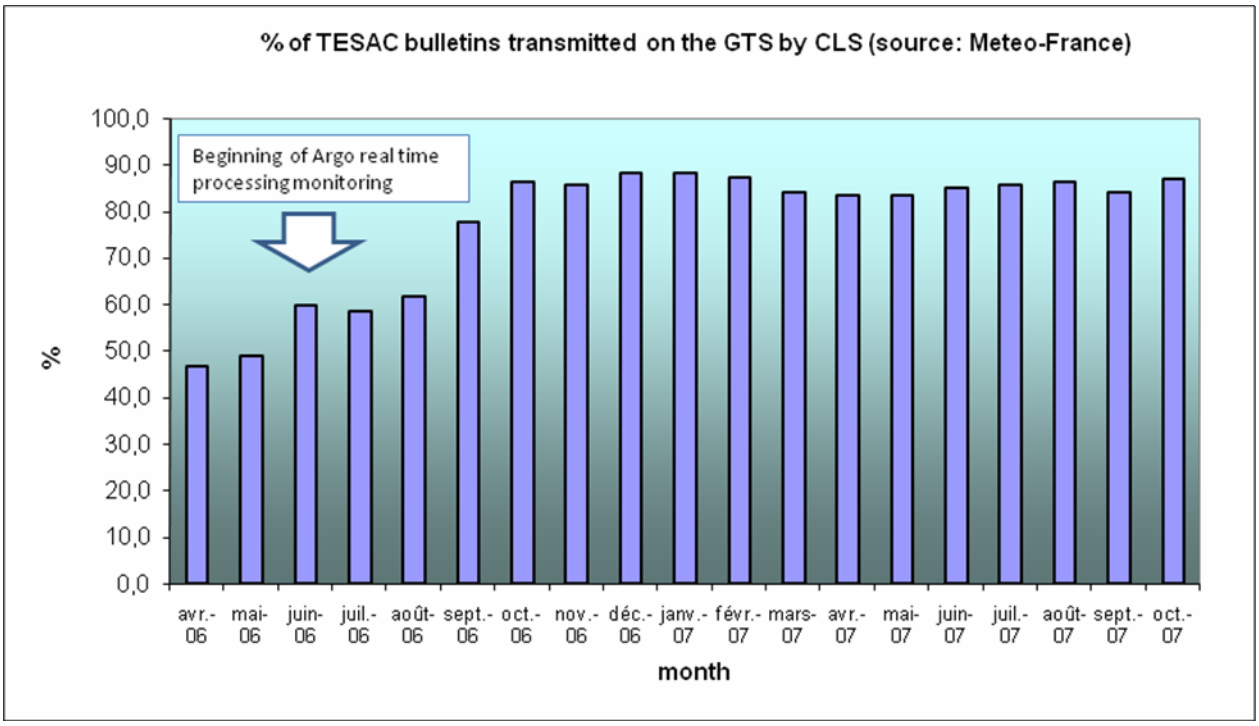
- **Argo Real Time processing monitoring:** Since 2006, the GTS processing of Argo data is more and more monitored at CLS. All different data formats are referenced and

each format has a dedicated template (processing model) in the CLS GTS database. Each month, a monitoring is made for Argo floats present in the CLS GTS database:

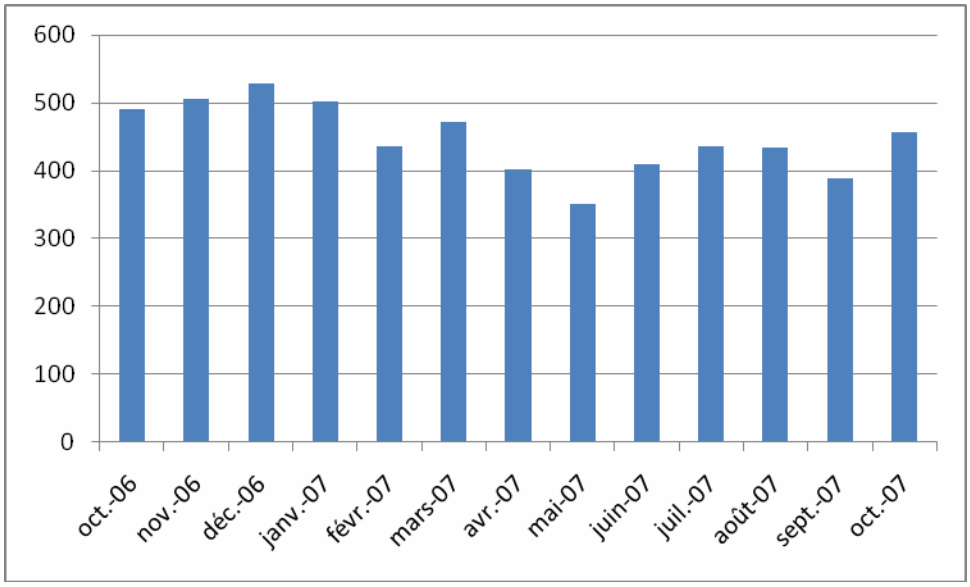
- Argos transmissions in the last month are checked for all floats,
- GTS disseminations in the last month are checked for all floats,
- New floats to be set up for GTS are implemented in CLS GTS data base at each beginning of month with a list (table 9: "Floats to be set up for GTS") provided by JCOMMOPS (M. Belbeoch) in the Argo Information Centre Monthly Report.
- Active floats to be grey listed are removed from the CLS GTS database at each beginning of month with a list (table 16: "Active floats Grey list") provided by JCOMMOPS (M. Belbeoch) in the Argo Information Centre Monthly Report.
- CLS GTS duplicates are monthly checked with MEDS report.
- In a monthly meeting between CLS and JCOMMOPS, all Argo requests are discussed and applied as soon as possible.



Graphic on CLS Argo GTS processing

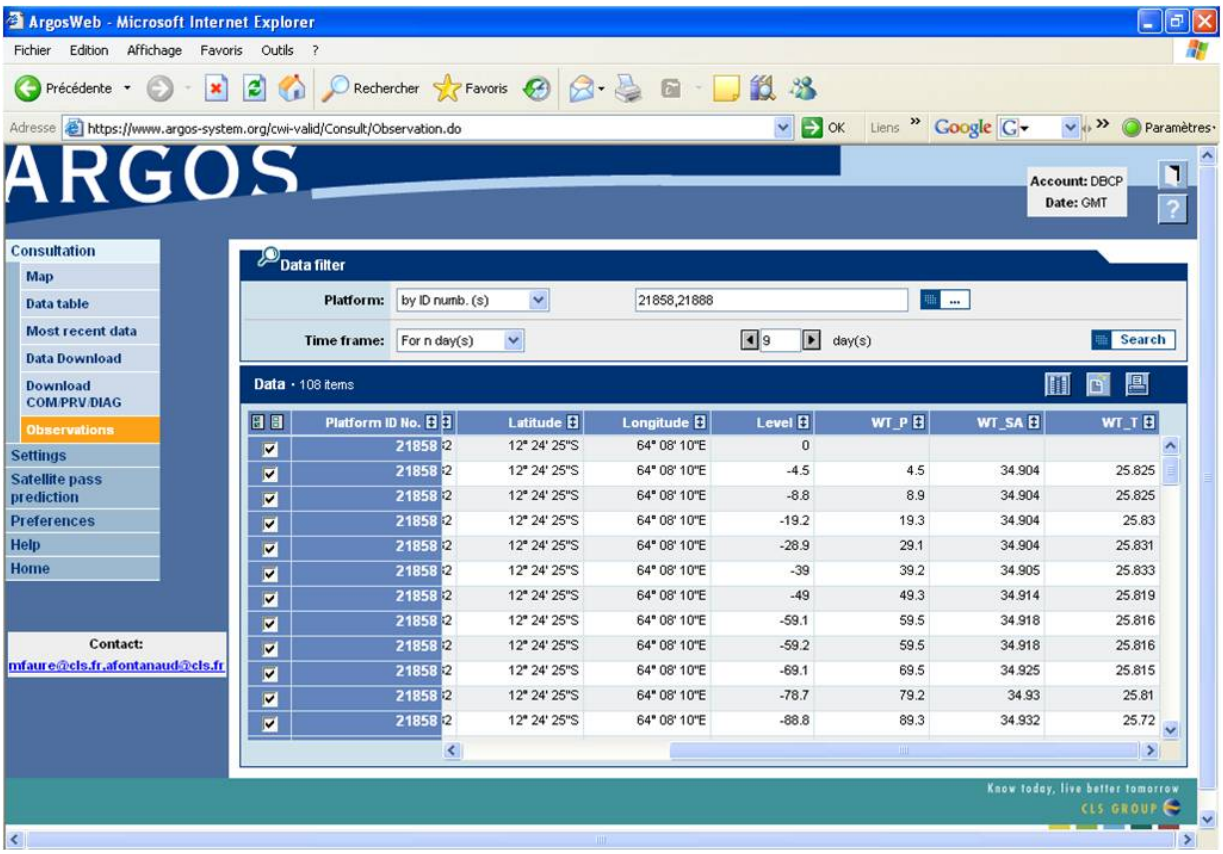


Graphic on % of Argo profiles disseminated on the GTS (~10% of profiles are currently filtered by Meteo-France for //// presence in TESAC reports)



Number of profiles send on the GTS by CLS per month

- **Web pages**: The web site of the CLS DAC is currently in validation progress. It will be included in the ArgosWeb (https://www.argos-system.org/) when the new CLS Argos processing will be operational (beginning 2008). It will consist of a user access to his observation data.



Print screen of future ArgosWeb with observation (Argo profile in this case) distribution.

Available in 2008

Argo National Data Management Report

German ARGO

1. Status
(Please report the progress made towards completing the following tasks and if not yet complete, estimate when you expect them to be complete)

- Data acquired from floats are managed by three German groups at the Alfred Wegener Institute (Bremerhaven), Federal Maritime Agency , BSH (Hamburg) and IfM-Geomar (Kiel). The real time data handling is managed by Coriolis. The german groups perform the delayed mode QC and issue the corrected data to Coriolis

AWI:
21 new floats have been deployed in 2007, altogether 50 floats are operating. Regular data flow, i.e., one profile per 10 days.

- Data issued to GTS

All, done by Coriolis. Please note that part of the data have a larger time lag, because they can not be transmitted during winter time due to ice coverage.

- Data issued to GDACs after real-time QC

All, done by Coriolis.

- Data issued for delayed QC

All, send to AWI

- Delayed data sent to GDACs

DMQC has been performed for all floats and D-files will be send to Coriolis by AWI at the beginning of November

- Web pages

http://www.german-argo.de/ **(very preliminary)**

- Statistics of Argo data usage (operational models, scientific applications, number of National Pis…)

n/a

- Products generated from Argo data …

n/a

2. Delayed Mode QC
(Please report on the progress made towards providing delayed mode Argo data, how it's organized and the difficulties encountered and estimate when you expect to be pre-operational .)
AWI: all float data have been run through the delayed mode at 6 month intervals using now the Annie Wong software. Some delay has been created by the necessary adaptation of files. The update of the reference data base with new profiles is poor, data coverage is not sufficient in parts of the southern ocean. Test runs with 'good' ARGO profiles are presently started to eliminate this problem.

BSH:
14 new floats have been deployed in 2007 altogether 53 floats are operating. Regular data flow, i.e., one profile per 15 days.

- Data issued to GTS

All, done by Coriolis

- Data issued to GDACs after real-time QC

All, done by CORIOLIS

- Data issued for delayed QC

All, send to BSH

- Delayed data sent to GDACs

All, submitted to Coriolis by BSH

- Web pages

http://www.german-argo.de/ **(very preliminary)**

- Statistics of Argo data usage (operational models, scientific applications, number of National Pis…)

n/a

- Products generated from Argo data …

n/a

2. Delayed Mode QC
(Please report on the progress made towards providing delayed mode Argo data, how it's organized and the difficulties encountered and estimate when you expect to be pre-operational .)
BSH: all float data have been run through the delayed mode at 6 month intervals using the Send/Boehme software. In September all files have been submitted to Coriolis as D-files. We anticipate some additional work at the next run in February 2008 due to the switch to the Annie Wong software and the necessary adaptation, but hope to be on time with the help provided by Coriolis. The update of the reference data base with new profiles is rather slow and this could create a problem in the near future, although at the moment the situation in the North Atlantic is still tolerable.

3. GDAC Functions **-none-**
(If your centre operates a GDAC, report the progress made on the following tasks and if not yet complete, estimate when you expect them to be complete)

- National centres reporting to you
- Operations of the ftp server
- Operations of the www server
- Data synchronization
- Statistics of Argo data usage : Ftp and WWW access, characterization of users (countries, field of interest : operational models, scientific applications) …

4. Regional Centre Functions **-none-**
(If your centre operates a regional centre, report the functions performed, and in planning)

IFM-Geomar:
2 new floats have been deployed in 2007 altogether 36 floats are operating (1 Nemo, 1 Provor, 34 Apex). Regular data flow, i.e., one profile per 10 days.

- Data issued to GTS

All, done by Coriolis

- Data issued to GDACs after real-time QC

All, done by CORIOLIS

- Data issued for delayed QC

All, send to BSH

- Delayed data sent to GDACs

X% submitted to Coriolis by IfM-Geomar

- Web pages

http://www.german-argo.de/ **(very preliminary)**

- Statistics of Argo data usage (operational models, scientific applications, number of National Pis…)

n/a

- Products generated from Argo data …

n/a

2. Delayed Mode QC
(Please report on the progress made towards providing delayed mode Argo data, how it's organized and the difficulties encountered and estimate when you expect to be pre-operational .)
IfM-Geomar: All float data will been run through the delayed mode using the Send/Boehme software. Some delays have been created by the leaving of the DMQC operator and the time required to train the replacement. No D-files have been submitted this year but we anticipate to be on time again soon and deliver all profiles as D-files by the end of December. We will switch to the Annie Wong software thereafter.

3. GDAC Functions **-none-**
(If your centre operates a GDAC, report the progress made on the following tasks and if not yet complete, estimate when you expect them to be complete)

- National centres reporting to you
- Operations of the ftp server
- Operations of the www server
- Data synchronization
- Statistics of Argo data usage : Ftp and WWW access, characterization of users (countries, field of interest : operational models, scientific applications) …

4. Regional Centre Functions **-none-**
(If your centre operates a regional centre, report the functions performed, and in planning)

Argo National Data Management Report (2007) – India

1. Status

- **Data acquired from floats**
  India had deployed 143 floats so far. Out of these 75 floats are active. All the active floats data are processed and sent to GDAC.

- **Data issued to GTS**
  Presently we do not have GTS access and hence we are not able to send Indian floats data to GTS. Up on our request CLS ARGOS is still continuing to send Indian floats data in TESAC format to GTS.

- **Data issued to GDACs after real-time QC**
  All the active floats (75) data are subject to real time quality control and are being sent to GDAC with in 24 hrs of acquisition.

- **Data issued for delayed QC**
  Out of 143 floats deployed, 93 floats are eligible (as of July 2007) for DMQC. Profiles corresponding to 81 floats are uploaded to GDAC.

- **Web pages**
  INCOIS is maintaining Web-GIS based site for Indian Argo Program. It contains entire Indian Ocean floats data along with trajectories. Further details can be obtained by following the link http://www.incois.gov.in/incois/argo/argo_home.jsp. Apart from the floats deployed by India, data from floats deployed by other nations in the Indian Ocean are received from the Argo Mirror and made available in the INCOIS website. User can download the data based on his requirement.
- **Trajectory**
  1. A total of **114 trajectory** netcdf files were processed and uploaded to the GDAC. The process of generation of trajectory netcdf files undergoes quality checks like position, time, cycle number, etc., and corresponding quality status is assigned to each parameter. Finally a visual check is performed to verify that there are no missing cycles without cycle numbers and to check the surface time intervals.
  2. **16 (PROVOR) floats** are not eligible for the processing of the trajectory data files in current processing procedure and a new method has to be adopted.
  3. **4 floats with oxygen sensors** also require another new procedure to be adopted for processing.
  4. The report on 2nd Argo trajectory workshop held at (ATW-2) Korea during 27 – 28 October 2006 has proposed new checks in the trajectory format and two scientific challenges for the trajectory files. The proposals and status of implementations is given in the following tables.

Trajectory - Format checks		Status
1	Introduce missing cycles and CYCLE_NUMBERs with CYCLE_NUMBER starting from zero.	Done
2	Julian day (JULD) to be made monotonic.	Done
3	Position_QC and JULD_QC to be made consistent with Table2 ofATW-2.	Done
4	Increment in JULD to be consistent with CYCLE_NUMBER	Done

Trajectory - Scientific challenges		Status
5	Estimation of times at end of ascent and start of descent	Code for the modules is under process and implementation takes 2-3 months
6	Estimation of position at those times by extrapolation of reported surface positions	Code for the module is under process

- **Statistics of Argo data usage**

  Argo data is widely put to use by various Organisations/ Universities/ Departments. Indian Meteorological Department (IMD) is using Argo data for their operational purpose. Scientists, Students and Researchers from INCOIS, NIO, SAC, C-MMACS, NRSA, IITM, NCMRWF, IISc etc are using Argo data in various analysis. Many paper based on Argo data were also published in reputed journals.

  INCOIS Argo web page statistics (for the past one year) are as shown below

Page	Hits	Visitors
Argo Web-GIS	3842	603
Data download	7367	244
Live Access Server	310	57
Argo products	510	52

- **Products generated from Argo data**

Many products are generated using Argo temperature and salinity data. The Argo T/S data are first objectively analysed and this gridded output is used in deriving value added products. More on this can be see in the RDAC functions.

2. Delayed Mode QC

INCOIS started generating and uploading D files to GDAC form July 2006, and as of today, profiles belonging to 93 floats have been subjected to DMQC. John Gilson's GUI is extensively used at different stages of DMQC. It is appreciated that he extended whole hearted support in setting up the GUI and slight modifications required due to platform change. But only profiles corresponding to 81 floats were uploaded to GDAC.

The remaining floats are to be treated differently as they fall under data sparse region. These floats are expected to be presented for discussion during the forthcoming ADMT meeting in Hobart, Australia.

Major bottle neck identified DMQC is:

- Lack of CTD profiles from North Indian Ocean is still a critical problem when decision is to be taken for a complicated case. As per the suggestions following the previous DMQC meeting, if I omit the data other than CTD from the reference database, it reduces too much in most of the area.

3. GDAC Functions

INCOIS is not operating as a GDAC.

4. Regional Centre Functions

- Acquisition of Argo data from GDAC corresponding to floats other than deployed by India and made them available on INCOIS web site.
- Delayed Mode Quality Control
  (Refer 2.0 above)
- Data from the Indian Ocean regions are gridded into 3x3 box for monthly and 10 day intervals. These gridded data sets are made available through Live Access Server (LAS). Users can view and download data/images in their desired format.
- Additionally SST from TMI and Wind from Quickscat are made available on daily and monthly basis. SSHA merged product is provided on ten day basis on INCOIS Live Access Server.
- Data Sets (CTD, XBT) have been provided to CORIOLIS, IFREMER for integration into the Reference Data Sets, used for Delayed Mode Quality Control.
- Value added products:
  Two types of products are currently being made available to various user from INCOIS web site. They are:
  (i) Time series plots corresponding to each float (only for Indian floats). This include the following plots:
    - Water fall plots
    - Surface pressure
    - Bottom most pressure
    - Surface temperature

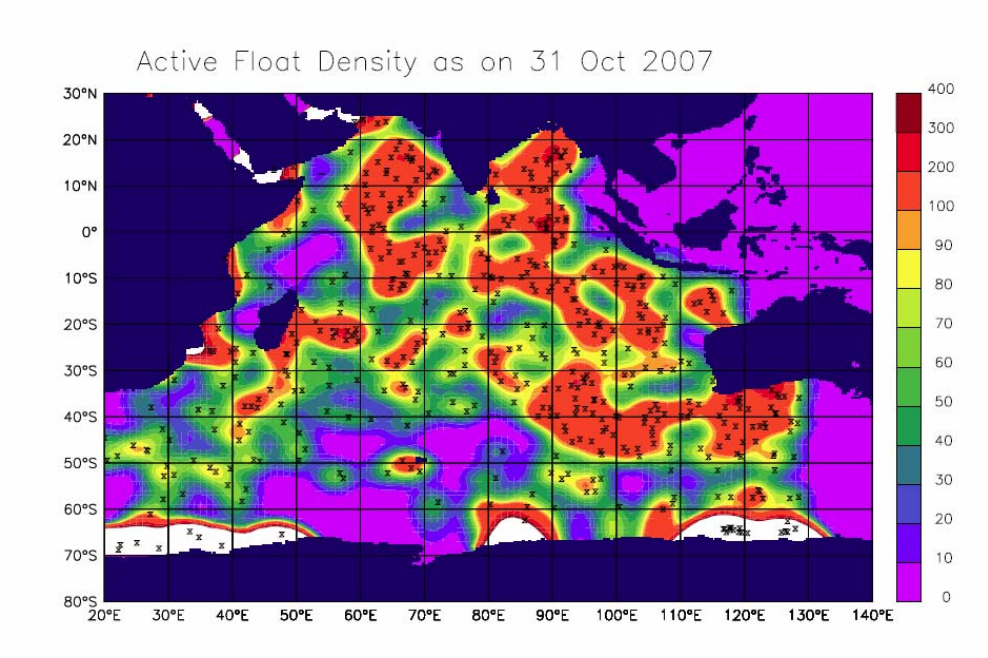
- Bottom most temperature
- Surface salinity
- Bottom most salinity
- Trajectory of float
- T/S plots.

(ii) Spatial plots using the objectively analysed from all the Argo floats data deployed in the Indian Ocean. This includes:

- Temperature (at 0, 75, 100, 200, 500, 1000 meters)
- Salinity (at 0, 75, 100, 200, 500, 1000 meters)
- Geostrophic Currents (at 0, 75, 100, 200, 500, 1000 meters)
- Mixed Layer Depth, Isothermal Layer Depth
- Heat Content up to 300 mts
- Depth of 20 deg and 26 deg isotherms

These valued added products can be obtained from the following link http://www.incois.gov.in/Incois/argo/products/argo_frames.html

- Regional Co-ordination for Argo floats deployment plan for Indian Ocean. The float density in Indian Ocean as on Oct 03, 2006 is shown below.



Argo National Data Management Report of Japan, 2007

1. Status

Data acquired from floats:

As of October 31, the Japan DAC(JMA) has processed data from 690 Argo and Argo-equivalent floats including 366 active floats .

Data issued to GTS:

All the profiles which passed real-time QC are issued to GTS using TESAC and BUFR code on an operational basis. Argo BUFR messages have been put on GTS since May 2007.

Data issued to GDACs after real-time QC:

All the profiles, technical and trajectory files, meta data files are transmitted to GDACs in netCDF format on an operational basis.

Data issued for delayed QC:

During Nov.2006-Oct.2007, the ARGOS messages for **11,973** profiles were acquired via CLS for delayed QC.

Delayed data sent to GDACs:

During Nov.2006-Oct.2007, **13,243** delayed profile files (D-files) have been sent to GDACs.

Web pages:

Japan Argo

http://www.jamstec.go.jp/J-ARGO/index_e.html

This site is the portal of Japan Argo project. The outline of Japanese approach on the Argo project, the list of the publication, and the link to the database site and PIs, etc. are being offered.

Real-time Database (JMA)

http://argo.kishou.go.jp/index.html

This site shows global float coverage, global profiles based on GTS TESAC messages, and status of Japanese floats.

Delayed mode Database (Argo JAMSTEC)

http://www.jamstec.go.jp/ARGO/J_ARGOe.html

This site shows Japanese float list, trajectory map, profile chart, and QCed float data. This site also shows global maps based on objective analysis (temperature, salinity, potential density, dynamic height, geostrophic current, etc.).

Statistics of Argo data usage:

Japanese PIs

There are 9 Japanese PIs who agreed to provide data to the international Argo

data management.

- Hokkaido National Fisheries Research Institute(HNF)
- Japan Agency for Marine-Earth Science and Technology(JAMSTEC)
- Japan Meteorological Agency(JMA)
- Meteorological Research Institute(MRI)
- National Institute of Polar Research(NIPR)
- National Research Institute of Fisheries Science(NRIFS)
- Ocean Research Institute, The University of Tokyo(ORI)
- Tohoku National Fisheries Research Institute(TNFRI)
- Tohoku University

Operational models of JMA

ODAS(the Ocean Data Assimilation System of JMA)

JMA has been operating the ODAS for the monitoring of El Niño and the Southern Oscillation (ENSO). The ODAS consists of an ocean general circulation model (OGCM) and an objective analysis scheme.
Visit http://ds.data.jma.go.jp/tcc/tcc/products/elnino/odas_doc.html for more information.

JMA-CGCM02(Coupled ocean-atmosphere General Circulation Model of JMA)

JMA has been operating JMA-CGCM02 for the prediction of ENSO. The oceanic part of this model is identical to the OGCM used for the ODAS.
Visit http://ds.data.jma.go.jp/tcc/tcc/products/elnino/cgcm02_doc.html for more information.

Compass-K(Comprehensive Ocean Modeling, Prediction Analysis and Synthesis System in the Kuroshio region)

Compass-k provides daily and monthly products of subsurface temperature for the seas around Japan and the Pacific Ocean.

Other operational models

JCOPE (Japan Coastal Ocean Predictability Experiment)

JCOPE is the model for prediction of the oceanic variation around Japan which is operated by FRCGC (Frontier Research Center for Global Change) of JAMSTEC. The Argo data is used by way of GTSPP. The hindcast data 6months back and the forecast data 3months ahead are disclosed on the following web site.
http://www.jamstec.go.jp/frcgc/jcope/index.html

FRA-JCOPE

FRA-JCOPE is the model based on JCOPE which is operated by Fisheries Research Agency (FRA).

Products generated from Argo data:

Products of JMA

El Niño Monitoring and Outlook

JMA issues the current diagnosis and the outlook for six months of ENSO in following web site. The outputs of the ODAS and the JMA-CGCM02 can be found here.
http://ds.data.jma.go.jp/tcc/tcc/products/elnino/index.html

The following parameter outputs of the Compass-K system can be found on http://goos.kishou.go.jp/rrtdb-cgi/jma-analysis/jmaanalysis.cgi

Subsurface Temperatures in the seas around Japan (item 5 on this web site)

Daily and Monthly mean subsurface temperatures at the depths of 100m, 200m and 400m analyzed for 0.25 x 0.25 degree grid points.

Pacific Subsurface Temperatures (item 6 on this web site)

Monthly mean subsurface temperatures at the depths of 100m, 200m and 400m analyzed for 0.5 degree-latitude x 1 degree-longitude grid points.

Products of JAMSTEC

MOAA (Monthly Objective Analysis using the Argo data)

MOAA is the global GPV data set which was made by OI objective analysis using monthly Argo data. Various maps have been made using MOAA, and opened to the public on the Argo JAMSTEC web site.

2. Delayed Mode QC

JAMSTEC has submitted the delayed mode files of 24,940 profiles to GDACs as of October, 2007. JAMSTEC started the execution of DMQC for the floats of Japanese PIs other than JAMSTEC. This action is based on mutual agreement by PIs in Japan. The procedure of DMQC in JAMSTEC is as follows.

(JAMSTEC floats and a part of equivalent floats)

1. (within 10days) data re-acquisition from CLS, bit-error repair (if possible), realtime processing, position QC, visual QC
2. (within 180days) surface pressure offset correction, cell TM correction
3. (after 180days) WJO salinity correction, the definitive judgement by expert, D-netCDF file making

(floats of PIs other than JAMSTEC)

Our QC system is now being improved for the floats of other PI s.
After the improvement, R-files will be acquired from GDACs, and the procedure after real-time processing will be executed according to the same way as the foregoing.

JAMSTEC restores some missing data at the time of real-time processing of DAC, and remakes the R-files including the restored data and send them to GDACs. In that case, D-file making is delayed more. This is the biggest cause of our backlog.
The new OW software is experimentally used together with the WJO, and the

calculation result of OW has been used as a reference at the definitive judgement. We have experienced some cases in which the recommended correction of WJO and/or OW is unsuitable. In this case, when a sensor has a clear offset, we cannot determine the adjusted value and cannot make D-file after all. This is the second biggest cause why the backlog has not been cleared.

3. GDAC Functions

The JAMSTEC ftp server has been providing the mirror site of GDACs since 2003.
ftp://ftp.jamstec.go.jp/pub/argo/ifremer/
ftp://ftp.jmastec.go.jp/pub/argo/fnmoc/

4. Regional Centre Functions

JAMSTEC operates PARC in cooperation with IPRC and CSIRO.
JAMSTEC is providing the float monitoring information in the Pacific region (e.g. float activity watch, QC status, anomaly from objective analysis, diagnosis plot for sensor correction, etc.), reference data set for DMQC (SeHyD and IOHB), the link to the CTD data disclosure site of Japanese PIs, some documents, and some QC tools on the following web pages.
http://www.jamstec.go.jp/ARGORC/

Dr. Yang who is the DMQC operator in Korea visited JAMSTEC in July, 2007. At that time, we offered him information on the DMQC technique of JAMSTEC, and discussed QC of the floats deployed in the Sea of Japan.

Argo National Data Management Report of Korea

1. Status

- Data acquired from floats

Deployment of Korea Argo floats

Year	Organization	Number of deployed Argo floats				Total
		East/Japan Sea	Northwest Pacific	Antarctic Ocean & others	subtotal	
2001	KMA	3	7		10	18
	KORDI	5	1	2	8	
2002	KMA	5	10		15	25
	KORDI	6		4	10	
2003	KMA	5	10		15	33
	KORDI	8		10	18	
2004	KMA	5	10		15	38
	KORDI	13		10	23	
2005	KMA	5	10		15	33
	KORDI	10		8	18	
2006	KMA	5	10		15	33
	KORDI	13		5	18	
2007	KMA	5	10		15	28
	KORDI	8		5	13	
Total		96	68	44	**KMA 100** **KORDI 108**	208

※ KMA: Korea Meteorological Administration
KORDI: Korea Ocean Research and Development Institute

- Data issued to GTS

Within 24 hours of data collection, the deployment all data of KMA Argo floats are issued to GTS by KMA in Korea.

Within 24 hours of data collection, the deployment all data of KORDI Argo floats are issued to GTS by CLS in France.

- Data issued to GDACs after real-time QC

RTQC system at KORDI is so flexible that it can handle data from different type of profilers. Prior to communicating the Argo datasets to GDAC, the KORDI ARGO dataset is processed by CLS, France for dissemination to GDAC.

KMA RTQC system produces profile data, metadata, technical data and trajectory data with TESAC and NetCDF format from raw data with 32byte hexa format in real time. Those 4 types of data are transmitted into GTS network and GDAC. The RTQC system is being upgraded by following the suggestions in the 6th ADM and Argo quality control manual ver. 2.1 and user's manual ver. 2.1.

- Data issued for delayed QC

During November 2006 – October 2007, KODC has acquired 6241 profiles via GDACs for delayed QC. KORDI has also been developing delayed mode QC schemes and salinity calibration methods for data obtained in the East/Japan Sea.

- Delayed data sent to GDACs

During November 2006 – October 2007, KODC has sent 916 delayed mode profile files of Korean Argo floats which were deployed by KMA and KORDI to the GDACs.

- Web pages

The KMA has operated and upgraded Argo web page, which consists of RTQC data linked to KMA (http://argo.metri.re.kr). The KODC has operated webpages for distribtuion of delayed mode Argo data and oceanographic information system for pelagic fishery based on Argo data (http://kodc.nfrdi.re.kr). KORDI has also operated Argo webpage (http://argo.kordi.re.kr).

- Statistics of Argo data usage

National Pis are Dr. Moon-Sik SUK from KORDI and Dr. Jang-Won Seo from KMA. Many scientists have applied the Argo data to the researches and operational oceanography. For example, data assimilation, circulation of the East/Japan Sea, and operation of oceanographic information system for pelagic fishery

- Products generated from Argo data …

Park, Y.-G., K.-H. Oh, K.-I. Chang, and M.-S. Suk, 2004: Intermediate level circulation of the southwestern part of the East/Japan Sea estimated from autonomous isobaric profiling floats, Geophys. Res. Lett., 31, L13213, doi:10.1029/2004GL020424

Oh, K.-H., Y.-G. Park, and M.-S. Suk, 2004: Accuracy and stability of temperature and salinity obtained from ARGO floats, [the Sea] J. of Korean Society of Oceanography *(in Korean) (accepted)*

Park, Y.-G., K.-H. Oh, K.-I. Chang, and M.-S. Suk, 2003: Intermediate level circulation of the southwestern part of the East/Japan, 1st Argo Science Workshop, 12-14, Nov. 2003, Tokyo.

Yong-Hoon Youn, Pankajakshan Thasathil, Homan Lee, 2003: Are the Older ARGO-Floats More Vulnerable to Fouling and Associated Salinity Drift Compared to that of Later Deployments?, 1st Argo Science Workshop, 12-14, Nov. 2003, Tokyo.

Homan Lee, Tae-Hee Kim, Jang-Won Seo, and Yong-Hoon Youn, 2003: Mean flow and variability at the Upper Portion of the East Sea Proper Water in the southwestern East Sea with APEX Floats. 1st Argo Science Workshop, 12-14, Nov. 2003, Tokyo.

You-Soon Chang, Homan Lee, Jang-Won Seo, and Yong-Hoon Youn, 2003: Error analysis with Argo data : On the ability of an OGCM to simulate the temperature and salinity in the western Pacific. 1st Argo Science Workshop, 12-14, Nov. 2003, Tokyo.

Yong-Hoon Youn, Homan Lee, You-Soon Chang, and Pankajakshan Thadathil, 2005: Validation of salinity data from ARGO floats: comparison between the older ARGO floats and that of later deployments. Journal of Korean Earth Science Society, v26(2), 129-136.

Park, JongJin, Kuh Kim, and William. R. Crawford, 2004, Inertial currents estimated from surface trajectories of ARGO floats. *Geophysical Research Letter,* 31, L13307,doi:10.1029/2004GL020191.

Park, JongJin, K. Kim, and B. A. King, 2004, Global Statistic of Inertial Motions, Geophysical Research Letter, 32, L14612, doi:10.1029/2005GL023258.

You-Soon Chang, Yong-Hoon Youn, 2005, Application of ARGO data. The 3rd Korea-Russia Joint workshop on climate change and variability, June 7-8, 2005, KMA, Korea

Park, JongJin, K. A. Park, K. Kim, and Y. H. Youn, 2005, Upper ocean response to Typhoons and Tropical Storms: Salinity change, AMS annual meeting, Sandiago, USA.

Yong-Hoon Youn, You-Soon Chang, Homan Lee, and Ji-Ho Kim, 2006, ARGO program and data application in METRI/KMA, 2nd Argo Science Workshop, submitted

You-Soon Chang, Chang-Woo Cho, and Yong-Hoon Youn, 2006, Validation of numerical model in the Pacific Ocean with ARGO data, 2nd Argo Science Workshop, submitted.

2. Delayed Mode QC

The PIs are responsible for DM and dissemination of the DMQC data to the GDACs under collaborating with the KODC. KODC has submitted the delayed mode files of 916 profiles of Korean Argo program in the North Pacific using SeHyD as reference dataset as of November 2007. In addition KODC collected recent CTD casts for a reference dataset in the East/Japan Sea. The reference dataset has about 1300 CTD casts after quality checks including the check using characteristics of stable water mass in the East/Japan Sea. In addition potential temperature levels were also modified considering water mass structure. KODC is going to submit delayed mode profile files in the East/Japan Sea to the GDACs after PI evaluation.

Argo UK Data Management Report

1. Status

- *Data acquired from floats* - Data from all UK floats are received at BODC by automatic download from the CLS database every 12 hours
- *Data issued to GTS* - Data from all UK floats are sent to the GTS every 12 hours. Almost 100% of TESACs messages are available within 24h. Disruptions happened due to email server failures and electricity shutdown.
- *Data issued to GDACs after real-time QC* - All UK data received at BODC are passed through the agreed real-time quality control tests 1 hour after the data arrives at BODC. All data that have been processed at BODC are queued for transferred to both GDACs which occurs twice a day. Any file that fails to be transferred is queued for the next transfer attempt the next day.
- *Data issued for delayed QC* - All UK float data are ready to be subjected to delayed mode quality control procedures.
- *Delayed data sent to GDACs* – The OW software is being used at BODC and work on sending delayed-mode data to the GDACs is ongoing.
- *Web pages* - BODC hosts the main data information and access pages. These pages include a list of the current status of all UK floats deployed, automatic request system for all UK float data, links to both GDACs and other Argo related sites and an interactive map giving information on last known positions, deployment positions and direct links to profile plots of the last profile reported by every float. Other information about Argo is also available.
- *Statistics of Argo data usage* – During the last year, UK metadata, trajectory and profile files have been provided to users through BODC website.
  Metadata files have been provided to NOCS (UK), Cochin University of Science and Technology (India), WRc (UK), Hebridean Whale and Dolphin Trust (UK), National Institute of oceanography (India), University Of New Brunswick (Canada).
  Trajectory files have been requested by NOCS (UK), National Institute of oceanography (India), WRc (UK).
  Profile files have been requested by Cukurova University, Faculty of Fisheries (Turkey), University of applied sciences Hamburg (Germany), NOCS (UK), National Institute of oceanography (India), Cochin University of Science and Technology (India), UK Hydrographic Office (UK), WRc (UK), University Of New Brunswick (Canada).
- *Products generated from Argo data* - Data from all Argo floats are assimilated in to the Forecasting Ocean Assimilation Model (FOAM) run at the Met Office.

2. Delayed Mode QC

During spring 2007, a half-time post to work on Argo Delayed Mode QC was taken up by Elizabeth Hawker. All processed floats which had been checked and agreed by the PI, Brian King, have now been submitted to the GDACs as D files. These include the floats processed by Andy Dale during summer 2006. The floats processed earlier by Rebecca McCreadie have also been resubmitted, as the original NetCDF files contained some errors. Some of the floats previously submitted have pressure offsets, so after confirmation with Brian King (PI) these floats may have to be resubmitted.

A total of 4492 delayed mode profiles have been submitted. We have now 29% of BODC DAC profiles in delayed mode, including all of our floats. Taking into account only floats available for delayed mode (excluding young floats less than 18 months), 40% of floats have been processed in delayed mode.

The OW software has been installed and we are planning to use this for all future processing. The Gilson GUI has also been installed, so this will be of great value in the processing procedure. SURFACE_PRESSURE is inspected at BODC, but no pressure adjustment is made at present. We do not apply a cell thermal mass correction in delayed mode yet as we have not fully compiled a comprehensive list of sensor types and operation.

The date at which we would be in a position of continuously staying up to date with the delayed mode processing is uncertain at present and is dependent on our resources. There is still quite a backlog of floats to process. The main problem we faced in trying to catch up this backlog was one of resources, as we had no staff available to work on the delayed mode processing for part of the year. Other potential problems, such as those associated with the processing of Southern Ocean floats and the reference database have not arisen yet as we have not have time to process these floats.

Summary of Delayed Mode Processing (excluding floats less than 18 months)

Region	Number of Floats	Floats Processed	Profiles Submitted	Floats outstanding
Indian Ocean	69	34	2042	35
North Atlantic	34	8	178	26
South Atlantic	25	23	1838	2
Southern Ocean	68	13	434	55
All	196	78 (40%)	4492	118 (60%)

3. Regional Centre Functions

BODC hosts the main data information pages. These pages contain Forecast Ocean Assimilation Model (potential temperature, salinity and velocity at five metres and 995.5 m) and an interactive map giving information on last known positions, deployment positions and direct links to both GDACs ftp sites.
Some Drake Passage cruise CTD data have been processed. They will be sent to CCHDO as soon as they have passed BODC quality controls.

Argo National Data Management Report of United States

October 11st 2006 - October 5th 2007

1. Status

- **Data acquired from floats:**

a- September 2006 to October 2007

Floats deployed:	367
Floats failed on launch:	*7*
Floats reporting:	*1,573*
Profiles quality controled:	*58,917*

b- 1997 to October 2007

Floast deployed:	*2,321*
Floats failed on launch:	*58*
Floats reporting:	*1,573*
No reports for more than 30 days, considered inactive:	*690*

- **Data issued to GTS:**

During the reporting period, Service Argos and AOML put 47,183 profiles on GTS.

A power failure at Argos Service caused a delay of 3 days for the transmission of data to GTS. This occurred in August 17-20, 2007 and affected.662 profiles.

Starting on March 2nd of 2007 , 190 SOLO floats with FSI sensors using ARGOS transmission were added to the grey list to avoid their distribution on GTS (others were already on the grey list for other reasons). These floast had problem with the pressure bin assignment. After the method of the pressure bin assignment was changed, 58 correctable floats taken off the grey list.

- **Data issued to GDACs after real-time QC:**

During the reporting period, 58,917 real-time profile, technical and trajectory netcdf files and 367 new meta netcdf files have been submitted to both GDACs. Total numbers of netcdf files submitted: 177,118

We added the new real time corection of salinity PSAL_ADJ to our processing routines. They are applied only to the floats with delay mode files. We reprocessed 13,553 real-time netcdf files.

SOLO floats with SBE sensors: 227 were re-processed to fix the problem with pressure. New real-time netcdf files were sith corrected pressures were created for 10,134 profiles.

SOLO floats with FSI sensors: 254 floats were re-processed. Of these 196 allowed partial correction and 58 allowed full correction. New real-time netcdf files were sith corrected pressures were created for 19,700 profiles.

- **Data issued for delayed QC:**

  Data is provided to the PIs and the delayed mode QC center daily on:
  ftp://ftp.aoml.noaa.gov/phod/pub/ARGO_FTP/argo/nc

- **Data sent to GDACs after delayed-mode QC:**

  During this period 45,041 delay mode profile files have been forwarded to the GDACs.

- **Publication describing the real-time data management system:**

  Schmid, C., R. L. Molinari, R. Sabina, Y.-H. Daneshzadeh, X. Xia, E. Forteza and H. Yang (2006): The Real-Time Data Management System for Argo Profiling Float Observations. Journal of Atmospheric and Oceanic Technology, 24 (9), 1608-1628

- **Web pages:**

  The URL for the US Argo Data Assembly Center is:
  http://www.aoml.noaa.gov/phod/argo/index.php
  It provides links to:
  - Documentation.
  - Operations.
  - South Atlantic Regional Data Assembly Center
  - FTP Services.
  - Related Sites.

- **Products generated from Argo data are available through two web sites:**

  http://www.aoml.noaa.gov/phod/sardac/products/index.php currently shows three products are derived from hydrographic profiles collected by Argo floats and other instruments:
  - Properties of the mixed layer (thickness, temperature and heat storage rate) as monthly fields.
  - Seasonal climatologies of temperature and salinity (maps, sections and scatter plots of the profiles, for 30°S-40°S, provided by Ariel Troisi).
  - Maps and cross-sections that depict the annual mean state in the upper ocean.
  - Maps of altimetry and geostrophic currents.

  http://www.aoml.noaa.gov/phod/argo/opr/index.php shows profiles, sections, trajectories and pressure records for individual floats processed at the US Argo DAC. This page also shows summary tables of active and inactive floats, statistics related to data distribution via GTS, and monthly maps depicting locations of Argo and XBT profiles.

2. Delayed mode QC

Scripps group:
Scripps has prepared and sent to the GDAC an estimated 18,946 delayed-mode (Dmode) profile files in the past year (Oct 5th, 2006 to Oct 5th, 2007). The total number of Dmode files from SIO has reached 29,334, 99.5% of SIO's Dmode eligible files. We define a cycle as being Dmode eligible if it is older than 12 months. In the past year, the number of Dmode files from SIO has increased by 11018. The remainder of those files submitted over the year, 7928, were resubmissions. Cycles were resubmitted upon a floats death, so that the entire error variable record obtained by OW (Owens, Wong) was consistent, or if newer cycles resulted in OW indicating salinity drift began earlier than previously submitted.

In the next year approximately 12,000 additional SIO measured Argo profiles will become eligible for Dmode. This increase over last years total is primarily caused by the larger number of floats in the SIO Argo array. We expect to be able to complete Dmode processing for these increased numbers of profiles as they become eligible.

SIO utilized the new OW salinity adjustment for the majority of Dmode activities over the year. In the South Pacific where the majority of SIOs floats are located, OW agreed well with previous WJO salinity drift estimates.

University of Washington group:
As of October 2007, there are 35569 UW Argo profiles that are older than 1 year, and hence mature enough for delayed-mode processing. Salinity and pressure adjustments have been carried out on these mature profiles, and to date 31762 D*.nc files have been produced by UW. This represents 90% of the UW backlog. The remaining 10% are UW Iridium floats that await software modification to deal with the greater number of vertical observation levels.

PMEL group:
PMEL continues to DMQC float data in a timely fashion. As of 9 October 2007, 18,981 profiles from PMEL floats (including PMEL Argo equivalent floats) had been reported. Of those profiles, 11,303 were older than one year, the Argo target for DMQC. PMEL has forwarded a total of 10,544 D-files to AOML, 93% of the DMQC target number. At the time that last year's report was written, PMEL was at 88% of the target, with 5,015 D-files forwarded vs. 5,717 profiles older than one year.

Our float DMQC procedure currently consists of the following steps: Automated correction, with visual check, of reported pressure drifts, and correction for the effect of these pressure drifts on salinity. Automated correction of conductivity cell thermal lag errors. Visual inspection and modification of quality control flags for adjusted pressure, temperature, and salinity using the SIO GUI. Running the WJO version 2.0 system and adjusting run parameters to get appropriate recommended salinity adjustments. Accepting or rejecting the WJO recommendations on the basis of comparison with nearly historical and Argo float profiles using the SIO GUI.

The PMEL Argo group has published an analysis sensor response errors (primarily the

conductivity cell thermal mass error) and their correction for SBE-41 and SBE-41CP CTDs (Johnson et al., 2007). A matlab function for making the conductivity cell thermal mass correction is available upon request from Gregory.C.Johnson@noaa.gov.

Reference:
Johnson, G. C., J. M. Toole, and N. G. Larson. 2007. Sensor corrections for Sea-Bird SBE-41CP and SBE-41 CTDs. Journal of Atmospheric and Oceanic Technology, 24, 1117-1130.

3. ARC

The South Atlantic Argo Regional Center (SAARC) is coordinating the effort of countries with interest in the Atlantic from 20°N to 40°S. The web site for the South Atlantic Regional Data Assembly Center provides background information, the reports from the 2005 meeting in South Africa and the 2006 workshop in Ghana, links to products and data servers (http://www.aoml.noaa.gov/phod/sardac/index.php).

Deployment opertunities provided by countries participating in SAARC can be found here: http://www.aoml.noaa.gov/phod/sardac/logistics/opportunities/index.php

A float donation program has been put in place. This program facilitates the float deployment in remote regions. It also provides regional data to the volunteers in participating countries (e.g. Argentina and Brazil).

Training and education: Plans for continued training in various African countries through the Africa Partnership Station (APS) program are discussed (Navy and NOAA). One of the purposes will be to train participants on how to deploy floats (and other instruments).

Development of the final stage of the Argo QC:

In an attempt to identify floats that may require further attention, a system is being developed to compare delayed-mode profile data, on a float-by-float basis, with products (currently the Levitus climatology of 2001), and with coincident profile data (buddies from CTDs, XBTs and other floats). The delayed-mode profiles are first interpolated to the standard depths of the Levitus climatology, in the range of 400 to 2000 m. No interpolations over a vertical distance of more than 110 m are performed. The interpolated data are then compared with the Levitus climatology of the same month. For the buddy check, any coincident profiles are interpolated to the same standard depths, and then compared with the delayed-mode profile. The distance in space and time for the buddies is currently limited to 150 km and 10 days. These distances can be adjusted and can be made regionally dependent if necessary. For each float, stastistics of float/climatology and float/buddy differences are derived to allow a quick identification of floats that may have problems over their lifetimes. The method also allows identification of time-varying problems (e.g. increasing differences over time). Since floats passing through high-gradient regions may reveal similar symptoms as floats with problems, it is intended to attempt to identify the floats that pass through such regions. The system will also allow application to real-time data from the floats.

argo data management

Argo data management
October 30th, 2007 version 1.0
Ref : cordo-rap-07-193
Loïc Petit de la Villéon
Thierry Carval

ARGO DATA MANAGEMENT REPORT
FRENCH GDAC

1. Introduction

This document is the annual report of the French Argo Global Data Assembly Centre (GDAC) for 2007.
The French GDAC is supported by the Coriolis project, a joint project for operational oceanography.

2. Argo GDAC Functions

2.1. National centres reporting to you

Currently, 9 national DACs submit regularly data to the French GDAC.

The additional GTS DAC contains all the vertical profiles from floats that are not handled by a national DAC. These data come from GTS and GTSPP projects. The GTS profiles are quality controlled by the French DAC (Coriolis).

On October 31st, the following files were available from the GDAC FTP site :

- AOML, USA
  - File types: meta-data, trajectory, technical and profile
  - 2390 meta-data files accepted
  - 179771 profile files accepted including 75376 delayed mode profiles
  - 2301 trajectory files accepted
  - 2300 technical data files accepted
- BODC, United Kingdom
  - File types: meta-data, trajectory and profile
  - 230 meta-data files accepted
  - 15833 profile files accepted, including 4492 delayed mode profiles
  - 215 trajectory files accepted
  - 193 technical data files accepted
- Coriolis : Denmark, France, Germany, Italy, Netherland, Norway, Spain, European Union
  - File types: meta-data, trajectory, profile and technical
  - 777 meta-data files accepted
  - 57458 profile files accepted, including 26312 delayed mode profiles
  - 771 trajectory files accepted
  - 771 technical data files accepted
- CSIO, China (HZ)
  - File types: meta-data, trajectory, technical and profile
  - 30 meta-data files accepted
  - 1628 profile files accepted, including 89 delayed mode profiles
  - 30 trajectory files accepted
  - 30 technical data files accepted
- CSIRO, Australia
  - File types: meta-data, trajectory, profile and technical
  - 176 meta-data files accepted
  - 11075 profile files accepted, including 7037 delayed mode profile
  - 171 trajectory files accepted
  - 176 technical data files accepted

- INCOIS, India
  - File types: meta-data, trajectory and profile
  - 143 meta-data files accepted
  - 13555 profile files accepted, including 7613 delayed mode profile
  - 119 trajectory files accepted
  - 86 technical data files accepted
- JMA, Japan
  - File types: meta-data, trajectory, profile and technical
  - 690 meta-data files accepted
  - 58190 profile files accepted, including 24966 delayed mode profiles
  - 681 trajectory files accepted
  - 680 technical data files accepted
- KMA, Korea
  - File types: meta-data, trajectory, profile and technical
  - 84 meta-data files accepted
  - 5825 profile files accepted, including 738 delayed mode profile
  - 77 trajectory files accepted
  - 77 technical data files accepted
- MEDS, Canada
  - File types: meta-data, trajectory, technical and profile
  - 223 meta-data files accepted
  - 15840 profile files accepted, including 12499 delayed mode profiles
  - 192 trajectory files accepted
  - 149 technical data files accepted
- GTS (data collected by GTSPP)
  - File type : meta-data, profile
  - 391 meta-data files accepted
  - 23595 profile files accepted, 0 delayed mode profile

2.2. Operations of the ftp server

- Meta-data, profile, trajectory and technical data files are automatically collected from the national DACs ;
- Index files of meta-data, profile and trajectory are daily updated ;
- GDAC ftp address: ftp://ftp.ifremer.fr/ifremer/argo

2.2.1. Operations of the OpenDAP data access

Using OpenDAP, Argo data appears to you as a local file, like a network file system over the web.
http://www.coriolis.eu.org/cdc/opendap-dods_distribution.htm
http://www.ifremer.fr/cgi-bin/nph-dods/data/in-situ/argo

2.2.2. Operations of the www server

Ifremer maintains a web site with real-time and delayed mode data or meta-data collected by GDAC. The following features are available :

- Display of Argo profiling floats
  - http://www.coriolis.eu.org/cdc/floats/cdcFloats.asp
  - Display all active/old floats per ocean
  - Display technical informations and graphics for floats and measurements
  - Distribute data in Argo NetCdf format or medatlas Ascii format.
- Web data selection interface :
  http://www.coriolis.eu.org/cdc/dataSelection/cdcDataSelections.asp
  - Select data by date, location and meta-data informations
  - Select Argo data and additional profiles from GTSPP program (XBT, CTD, buoys)
  - Distribute data in Argo NetCdf format or medatlas Ascii format.
- Display GDAC monitoring statistics
  http://www.coriolis.eu.org/cdc/argo_gdac_monitoring.htm
- Meta-data files monitoring
  Once a week, a global monitoring of Argo meta-data files is performed.
  - A list of 24 highly desirable meta-data parameters is defined.
  - For each float of each DAC, each missing or incorrect highly desirable parameter is pointed out
  - http://www.coriolis.eu.org/cdc/metadataArgo/cdcMetadataArgos.asp
- Argo data area selection
  The user enters the boundaries of an area. For each float that crossed this area, all profile data are delivered to user.
  - http://www.coriolis.eu.org/cdc/ArgoZonalDataSelection/cdcArgoZonalDataSelections.asp

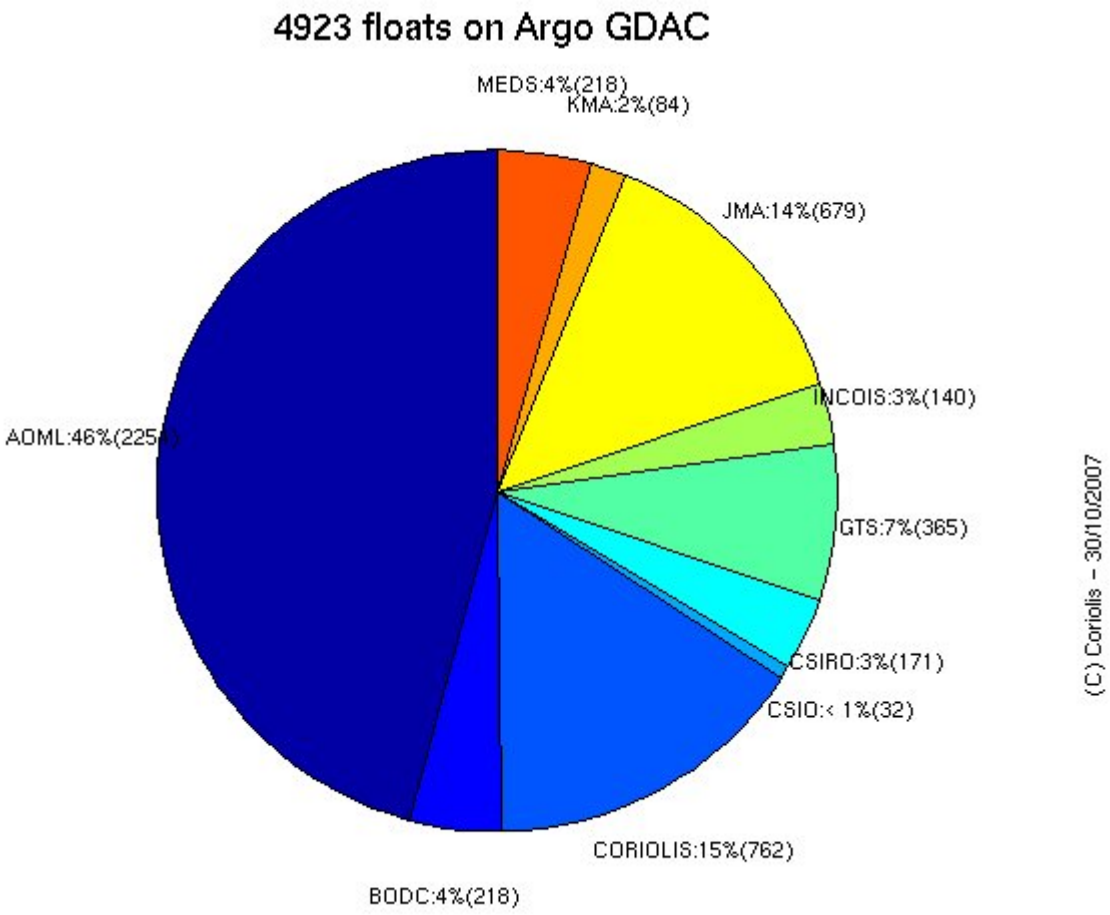
2.2.3. Data synchronization

- Implemented on 20/02/2003, the synchronization with US-GDAC is performed once a day.
  All meta-data, profile and trajectory files available on US-GDAC and missing or older on Coriolis GDAC are collected.

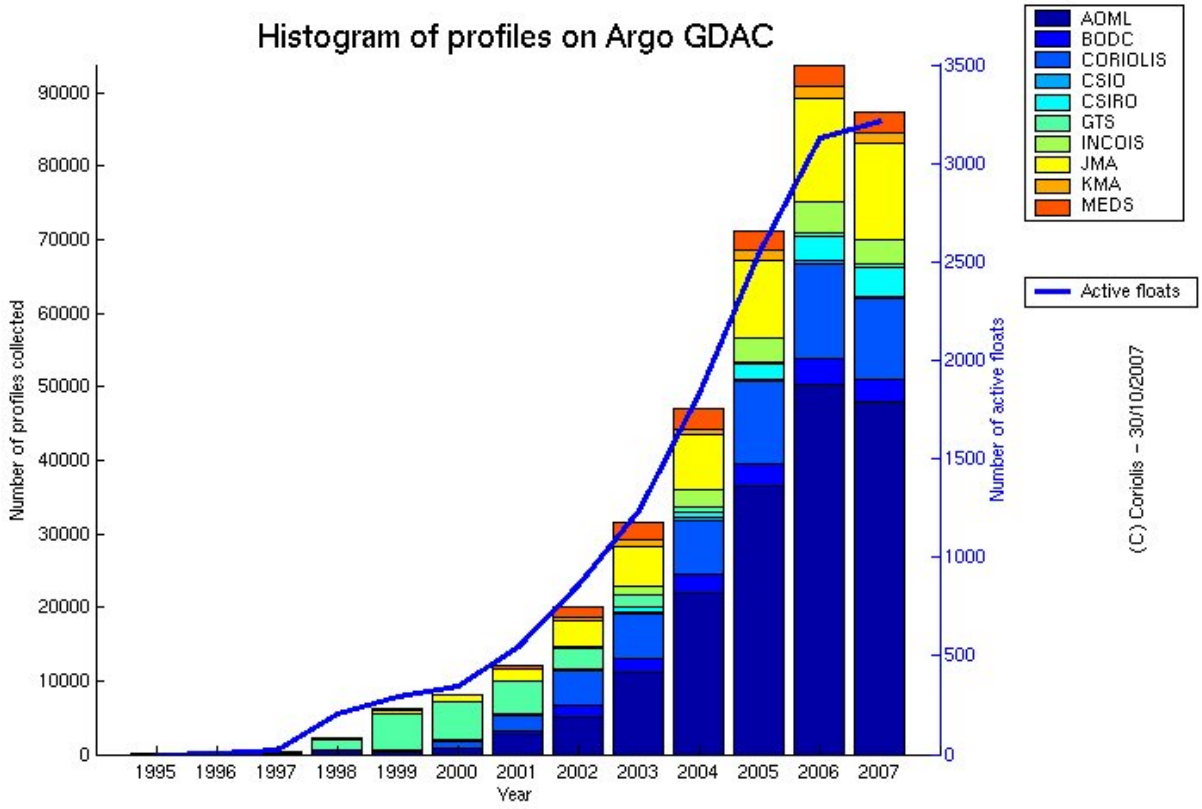
2.2.4. Grey list

According to the project requirements Coriolis GDAC hosts a grey list of the floats which are automatically flaggued before any automatic or visual quality control.

The grey list holds 630 floats (31st October 2007)

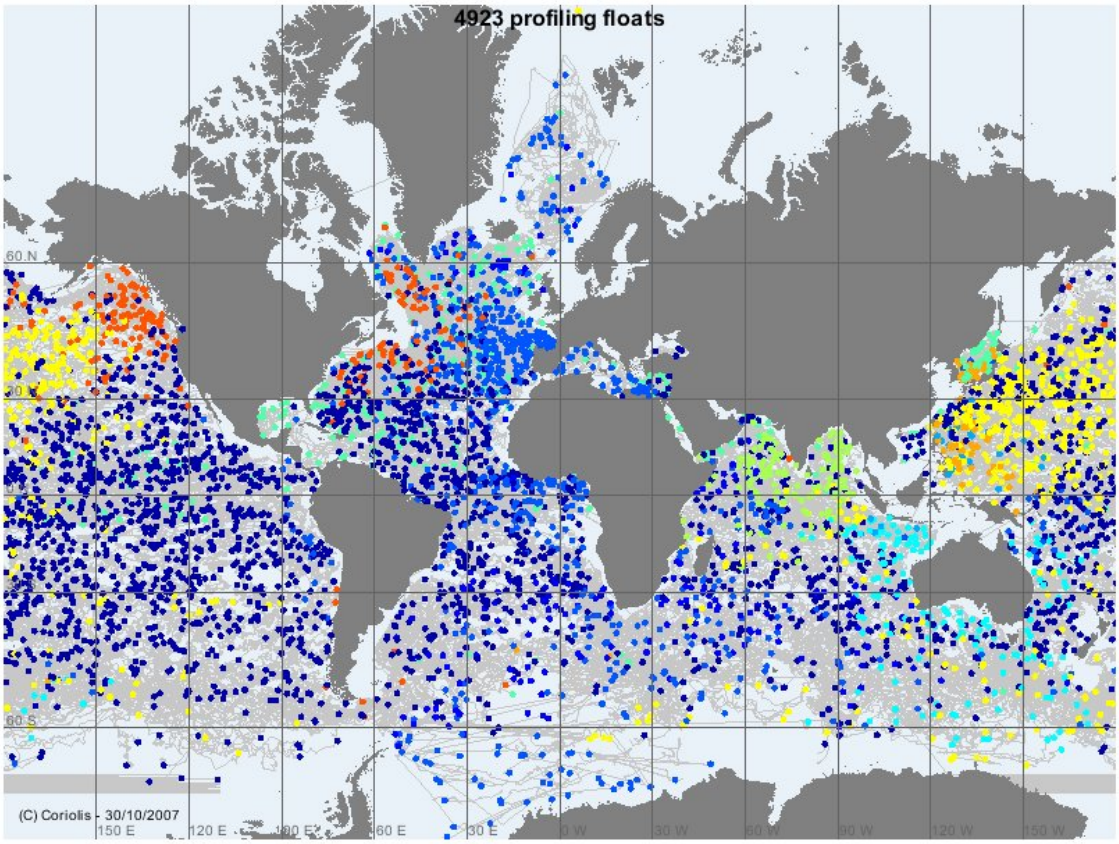


Argo GDAC : floats distribution per DAC in October 2007

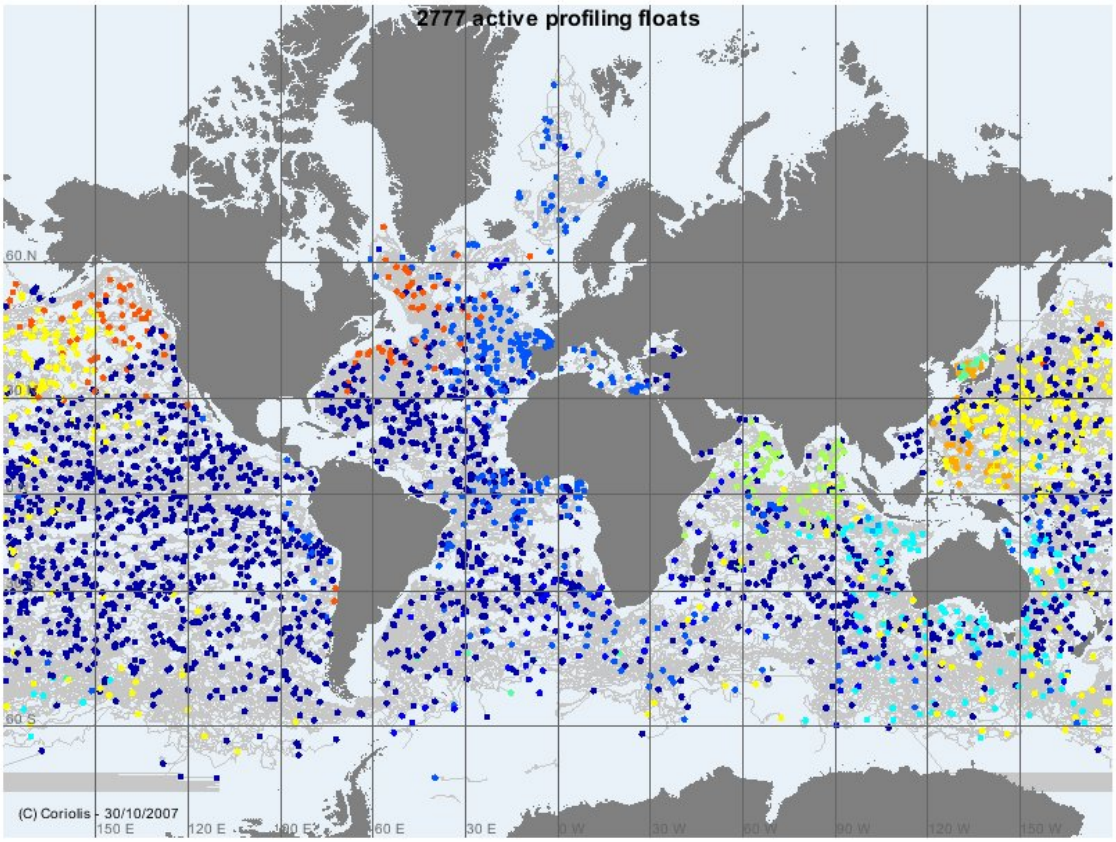


Argo GDAC : profiles distribution per DAC in October 2007

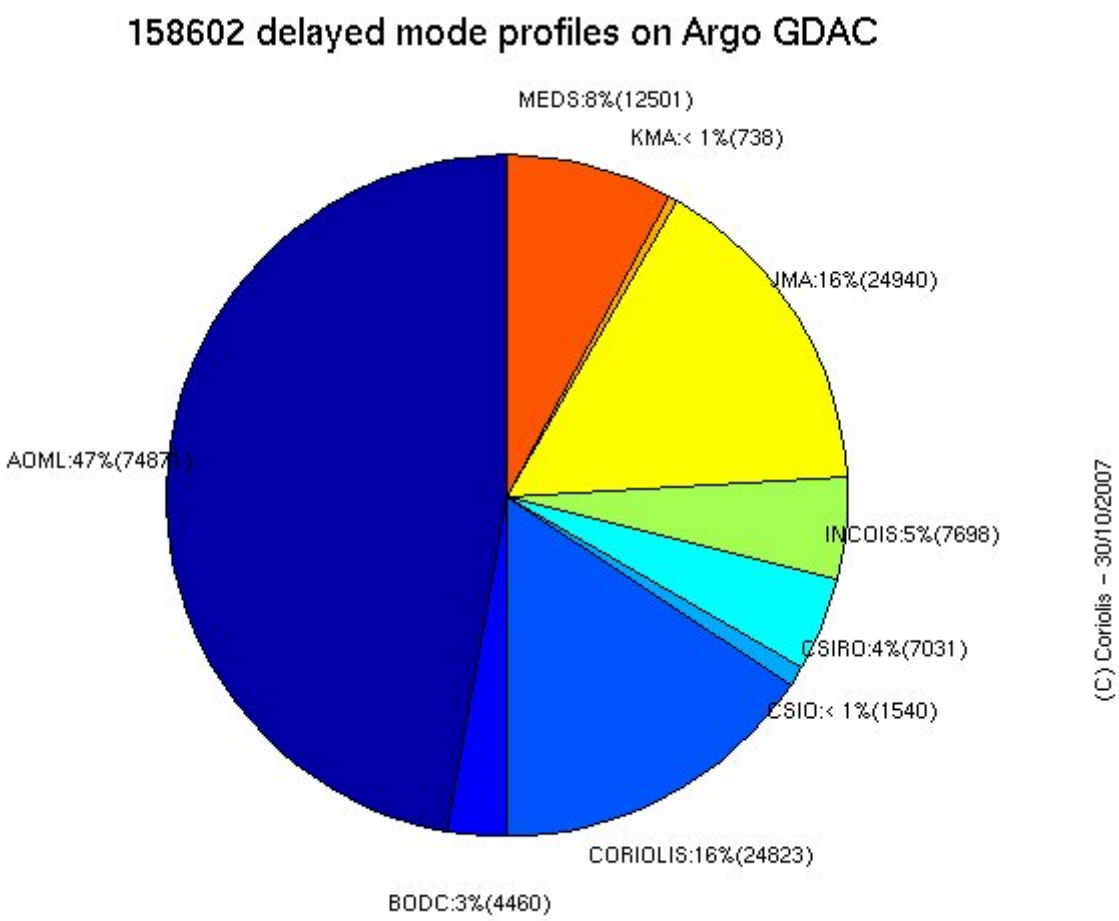
Warning : the blue line displays the total number of active floats during a year. This total is different than the floats active at a particular day.



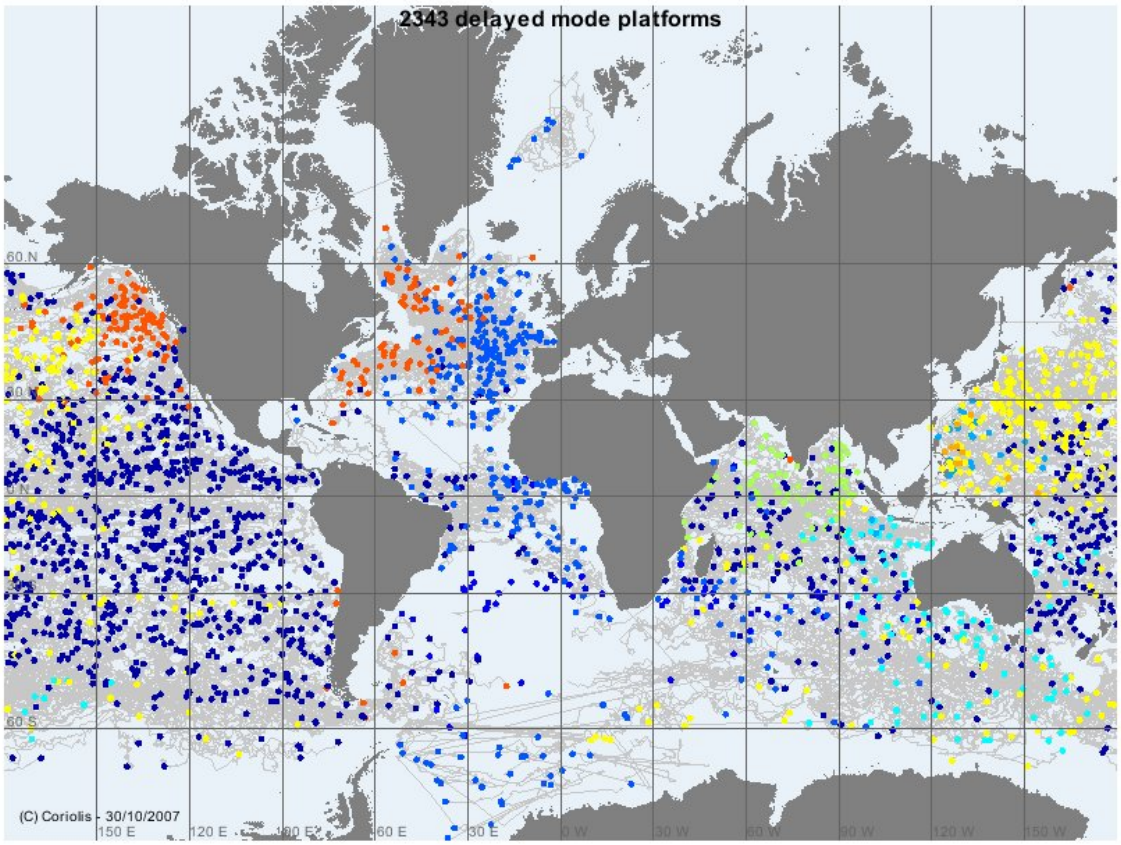
Argo profiling floats availables from GDAC in October 2007
(This map includes active and old floats)



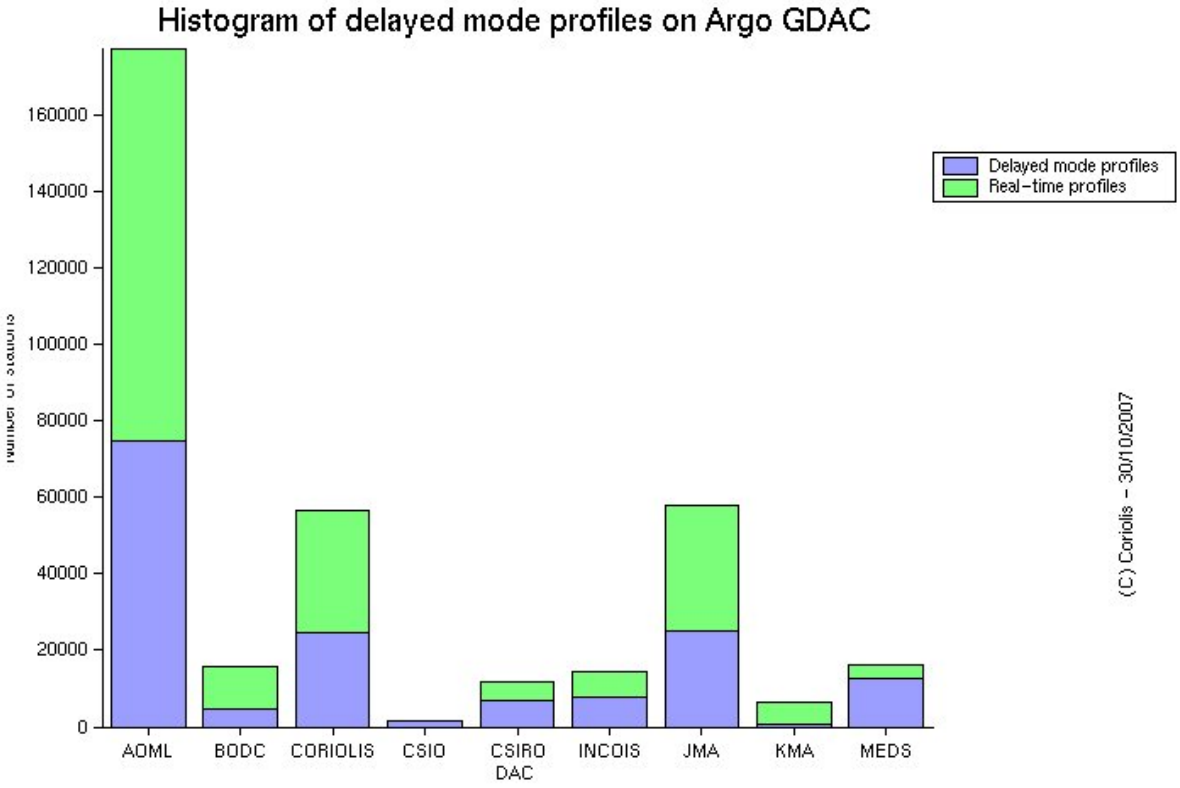
Active Argo profiling floats availables from GDAC in October 2007



Argo GDAC : delayed-mode profiles distribution per DAC in October 2006



Argo profiling floats with delayed-mode profiles availables from GDAC in October 2007



Argo GDAC : delayed-mode profiles available for delayed-mode in October 2007

2.2.5. Argo additional features

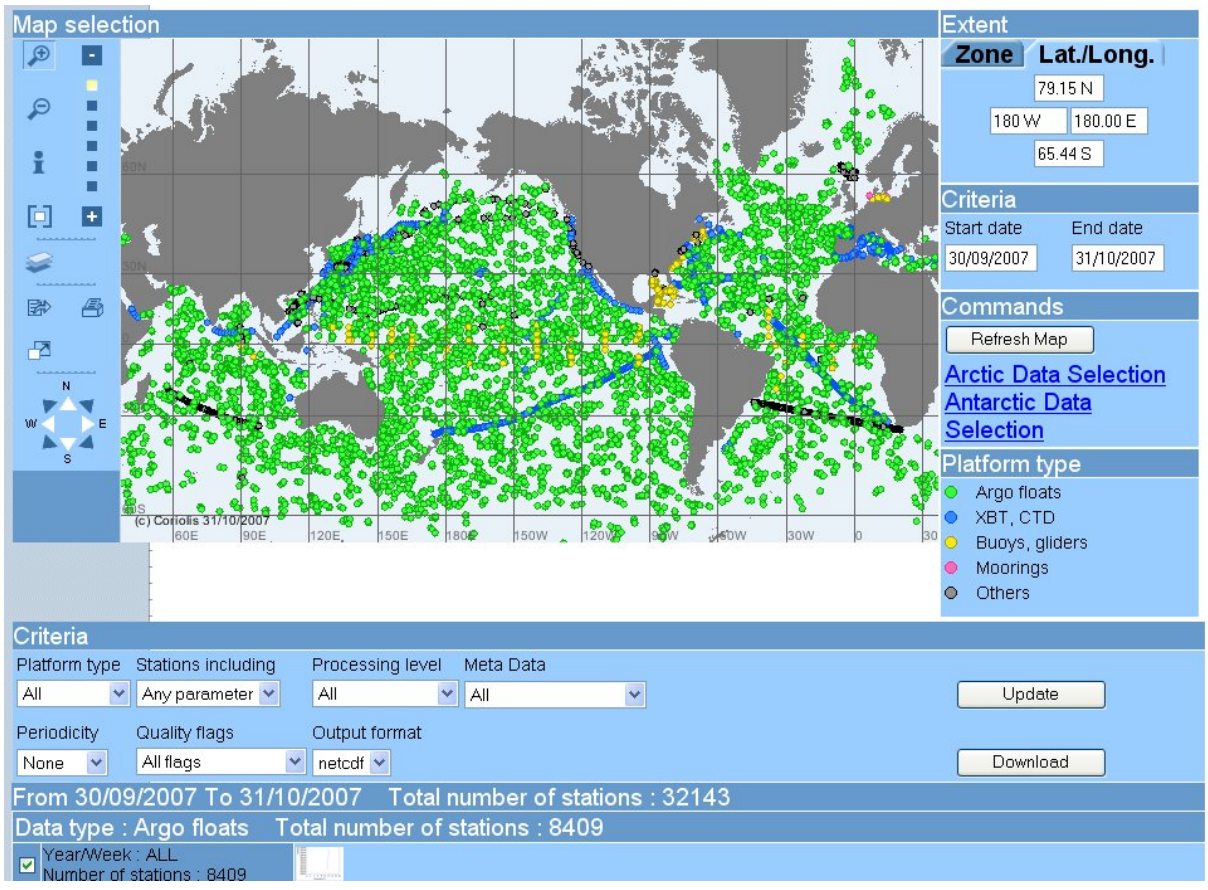
metadata weekly report

Dac Name	Number of files	Number of anomalies
aoml	2390	56
bodc	230	0
coriolis	777	3
csio	30	0
csiro	176	0
incois	143	0
jma	690	0
kma	84	1
kordi	0	0
meds	223	1

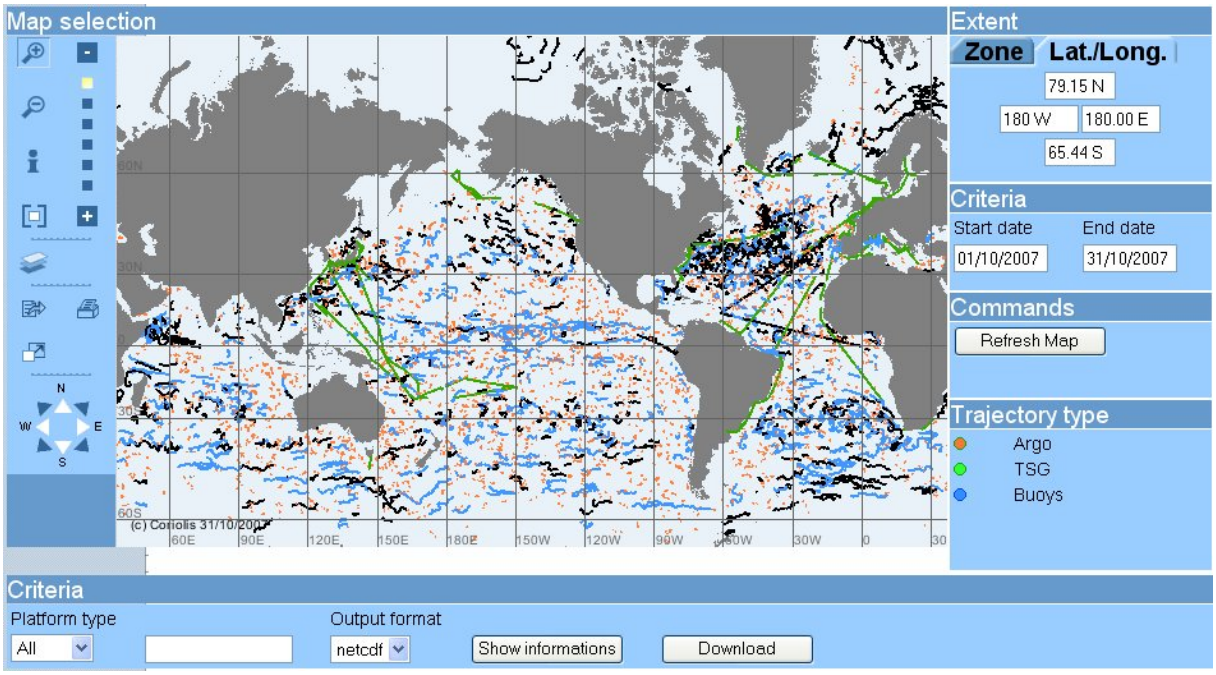
You can download the report here

Meta-data files monitoring
A list of 24 highly desirable meta-data parameters has been defined. For each float of each DAC, each missing or incorrect highly desirable parameter is pointed out

3. Coriolis additional features



Coriolis provides an on line data selection service which give access to wordwide dataset including Argo data, XBT, CTD and mooring (here is a display of the data available and collected in October 2007).
(green dots : Argo profiles, blue dots : GTSPP XBT profiles, yellow dots : buoys and moorings)



Argo and other trajectory data available from the data selection interface, for the month of October 2007
(Orange lines : Argo trajectories, blue lines : DBCP buoy trajectories, green lines : Gosud thermosalinographs)

Global Argo Data Repository Status Report of US NODC for 2007

November 2007

1. Summary

The US National Oceanographic Data Center (NODC) intended to use this report as input for the eighth Argo Data Management Team annual meeting at the Marine and Atmospheric Research of the Commonwealth Scientific and Industrial Research Organisation of Australia in Hobart, Australia from 14 to 16 November 2007. The report summarized the Argo user statistics and the highlights of the Global Argo Data Repository (GADR) activities since the seventh Argo Data Management Meeting in Tianjin, China in November 2006.

2. GADR Functions and Operations

The NODC operates the Global Argo Data Repository (GADR), known as the Argo long-term archive, for managing and archiving the Argo data and information. The GADR performs six functions as defined at the 4th ADMT meeting in Monterey, CA:

- Archive profiles, metadata, trajectory and technical information received from the GDAC on a monthly basis.
- Provide tools to allow transformation of Argo netCDF data into other forms.
- Provide usage statistics, data system monitoring information and problem reporting facility.
- Provide data integration tools to allow client to get Argo float data combined with data collected with other instruments.
- Provide hardcopy data sets for distribution to users.
- Provide offsite storage of data.

3. Usage Statistics

This analysis was produced by analog 5.24 (http://www.analog.cx). We use the following basic definitions:

- The number of distinct hosts is the number of different computers requests has come from. The host is the computer (often called the "client"), which has asked for a file.
- The file might be a page (i.e., an HTML document) or it might be something else, such as an image. By default filenames ending in (case insensitive) .html, .htm, or / count as pages.
- The number of requests is the total number of files downloaded, including graphics.The total requests counts all the files which have been requested, including pages, graphics, etc. (Some people call this the number of hits). The requests for pages only count pages. One user can generate many requests by requesting lots of different files, or the same file many times.

Figure 1 illustrates the number of monthly distinct hosts served by the GADR from 1 October 2006 to 30 September 2007. The monthly average of distinct hosts served by the GADR increased dramatically from 1,959 to 2,373 or 21% increased during the period of Year 2006.

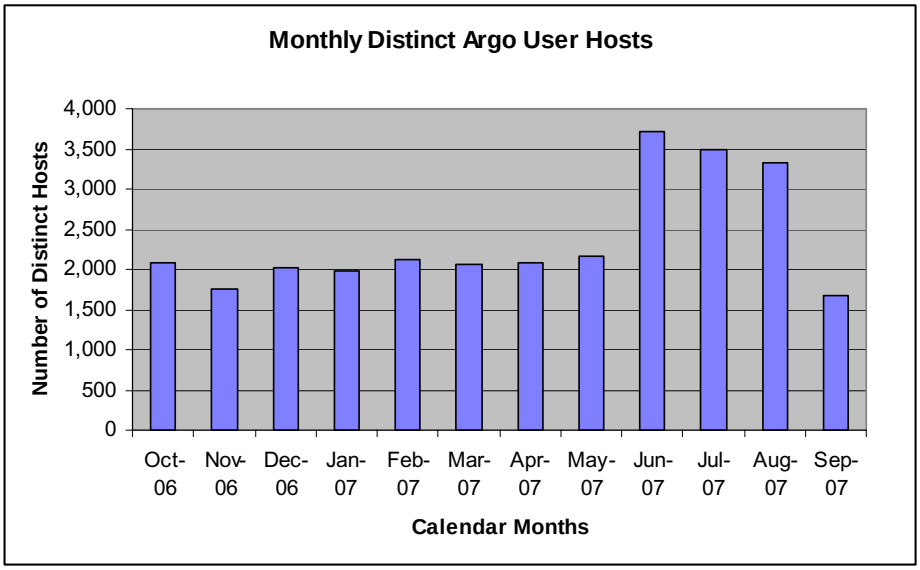


Figure 1. Monthly distinct hosts of the Argo data users

Figure 2 illustrates the monthly Argo data files downloaded from the GADR Web site over the past 12 months ending September 2007. The GADR receives an average of 455,909 requests per month, increased from 375,267 requests per month last year and the monthly-averaged Argo data downloaded increased to 17.85GB from 12.52GB in 2006.

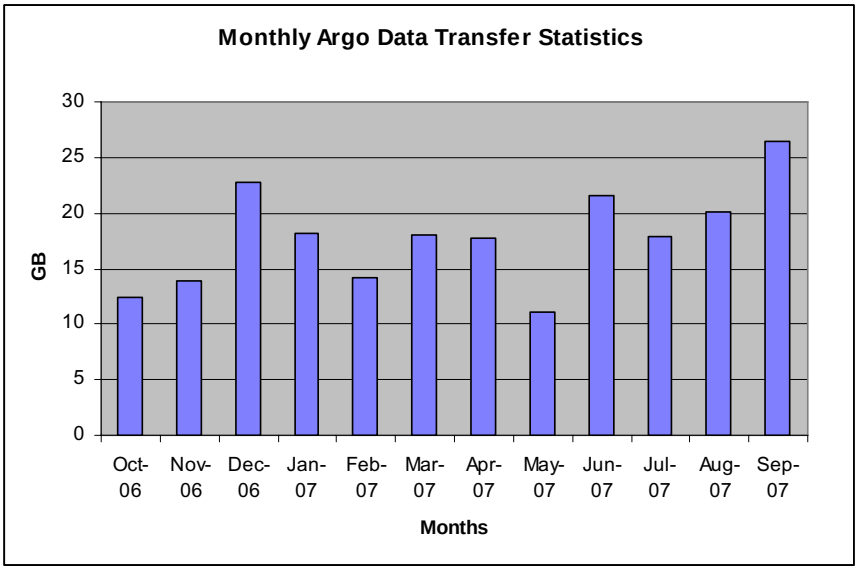


Figure 2 Monthly data transfer statistics of the Argo data.

4. Highlights of Activities

4.1. Continue to transfer the Argo data from the Argo US GDAC – The NODC continues to use the improved "mirror" facility of the UNIX "lftp" command. The GDAC's files are copied from "http://www.usgodae.org/ftp/outgoing/argo/", the "geo" subdirectory is skipped, and files which are no longer present on that site are removed from the local mirror. This command runs automatically twice daily, at 12am and 5am UTC. The last mirroring process completes by about 8:30 am UTC.
4.2. Monitor Argo floats report pressure as depth on the GTS once a month.
4.3. Updated Argo DVD, which contains the Argo data archived at the NODC as of 1 November 2007. Placed the DVD (Draft Version 2007) at http://argo.nodc.noaa.gov and a compressed archive of the DVD with ".tgz" format at http://data.nodc.noaa.gov/argo/dvd and ftp://data.nodc.noaa.gov/pub/data.nodc/argo/dvd
4.4. Created a DVD ISO9660 image of Argo Global Data Resource DVD, which is a hybrid ISO9660/JOLIET/HFS file system with Rock Ridge attributes. Populated the Argo DVD image at http://data.nodc.noaa.gov/argo/dvd and ftp://data.nodc.noaa.gov/pub/data.nodc/argo/dvd
4.5. Tested the Linux "*K3b*" software for burning the Argo Global Data Resource DVD ISO9660 image. "*K3b*" is optimized for desktop environment applications of the Linux/UNIX workstations. Being licensed under the GNU General Public License (GPL), it is more cost effective ("free") and efficient than using commercial off-the-shelf (COTS) computer software.
4.6. Hosted a CCHDO-NODC cooperation meeting on 11 September 2007 in Silver Spring, Maryland. The aim of the meeting was to discuss the ways in which the NODC could assist the Argo data management team to meet requirement in the preparation of Argo reference data sets and coordinate the submissions of CCHDO CTD to NODC for long-term archive and to Coriolis for updating the Argo reference database.
4.7. Provided AOML with 15 hard copies of the Argo draft DVD Version 3.0 for use as training material at the Argo Capacity Building for the Atlantic Countries Workshop, University of Ghana, Department of Oceanography & Fisheries, Accra, Ghana, December 5-7, 2006. (http://www.aoml.noaa.gov/phod/sardac/meetings/2006Dec05/index.php).

Argo Information Centre Report

Submitted by the Argo TC, M. Belbeoch
ADMT #8, November 2007

1. Background

The international Argo Information Centre (AIC) is participating in the activities of the Argo Project Office and of the JCOMM in situ Observing Platform Support centre (JCOMMOPS).

The AIC is funded on a yearly basis via voluntary contributions from the United States, Canada, France, Australia and the United Kingdom.
In 2007 **China**, **India**, and **Germany** also began providing funds for the AIC.

2. JCOMMOPS

The JCOMM in-situ Operating Platform Support centre is the natural outcome of international coordination mechanisms which began in 1985 with the Data Buoy Cooperation Panel (DBCP). It was implemented in conjunction with the Argo Information Centre (AIC) in Feb. 2001, to develop the synergies that exist between the coordination structures that had been established under the WMO and IOC of UNESCO, for the DBCP, the Ship of Observation Team (SOT), and the Argo pilot project.
JCOMMOPS was formally established by JCOMM I in 2001.
Synergy was therefore achieved between these three global marine observational programmes to assist, at the international level, those in charge of implementing their National components.

JCOMMOPS is a component of the international coordination mechanism, which aims on behalf of JCOMM to:

- develop **synergies** between observing systems
- assist in the **planning**, **implementation** and **operations** of the observing systems
- **monitor** and **evaluate** the performance of the networks
- encourage **cooperation** between communities and member states
- encourage **data sharing**
- assist in **data distribution** on Internet and GTS
- relay users **feedback on data quality** to platforms operators
- provide **technical assistance** and **user worldwide support**
- act as a **clearing house** and **focal point** on all programmes aspects

More general information on http://www.jcommops.org

Today, JCOMMOPS faces the challenge of strengthening its infrastructure, integrate the existing services better and eventually extend its operations to new observing systems.

A JCOMM Joint Circular Letter invites institutions interested in hosting a JCOMM Observing Programme Support Centre (OPSC) to submit a “Letter of Intent” to IOC or WMO (deadline: 15/11/2007)

3. TC Activities

In 2007 progress has been made on the following issues:

- Improve Argo implementation monitoring and planning:
  - upgrade and document the notification mechanism
  - develop new products (maps, statistics, GIS data layers, web pages, text file exports, etc)

- Improve Argo Data distribution monitoring:
  - New set of (dynamic) statistics on real-time and delayed-mode profiles

- Improve monthly reporting to PIs/Programmes Managers, float operators and data managers.

- Upgrade the JCOMMOPS information System:
  - New server installed and configured
  - Software upgrade (in particular the GIS)
  - Routine scripts and procedures reviewed and rationalized (in particular the GIS data layers update)

- Finalisation of the new AIC website

Other tasks are on-going (see ADMT#7 Report).
The monthly report continues to be enhanced and improved each month. Operators have regularly provided feedback to the AIC between the reports (See annex).

It is to be noted that the effort required assisting in retrieval of beached floats and preparation of donor programmes has increased.

The work load regarding JCOMMOPS issues has naturally grown up since 2001.
The Argo co-chairs have recognized the TC growing responsibility in developing and operating JCOMMOPS, and have agreed to update the TC Terms of Reference to reflect this change in scope.

2007 TC Missions:
1st Argo Training Sessions, Accra, **Ghana**
Visit Ifremer / IRD / Meteo France (with TC DBCP), Brest, **France**
EURO Argo, and **North Atlantic Argo Regional Centre #2** meetings, Brest, **France**
Argo Steering Team#8, IOC, Paris**, France**
ABE-LOS #7, Libreville, **Gabon**
JCOMM OCG, Geneva, **Switzerland**

Proposed Missions for 2007-2008:
Visit new Argo contributor **SIO/SOA**, Hangzhou, **China (done)**
Visit new Argo contributor **INCOIS,** Hyderabad**, India**
Visit new Argo contributors, **Germany**
GEO Ministerial Summit**,** Cape Town**, South Africa**
Argo workshop, Rabat**, Morocco**
ABE-LOS inter-sessionnal workshop, Washington**, USA (done)**
Argo Data Management Team#8, Hobart, **Australia**
Argo/DBCP Training Session, West Africa
Argo Steering Team #9, Exeter**, UK**

4. Information System

General issues:

In 2007 a new server was set up and has brought the JCOMMOPS Information System onto an improved IT configuration.
Discussions are being held with CLS (JCOMMOPS host) to strengthen the operational status of the system, developing monitoring and warning tools, and clarify the means required to maintain the system. This is done keeping in mind the possible relocation of JCOMMOPS.

The AIC website is gradually improved and has reached a stable state.

The AIC Homepage: http://argo.jcommops.org

Argo Implementation:

- **Planning & Notification:**

This core function of the AIC has been reviewed, improved and documented with the aim to provide a global and regular view on the Argo planning, up to a year in advance.

This information is vital for:

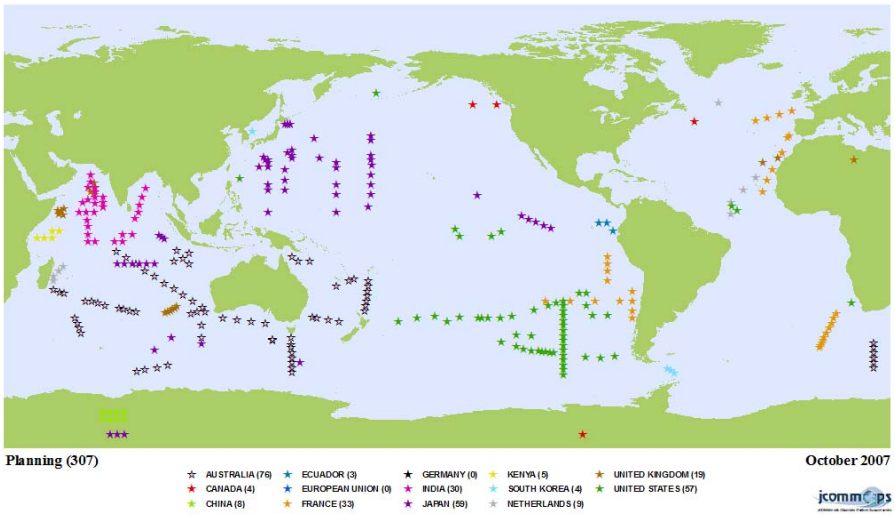
- The implementation and maintenance of the global array
- The project transparency and accordance with international rules
- The cooperation within Argo and with other panels (e.g. DBCP)

Careful planning should contribute to making Argo an operational and sustainable programme.

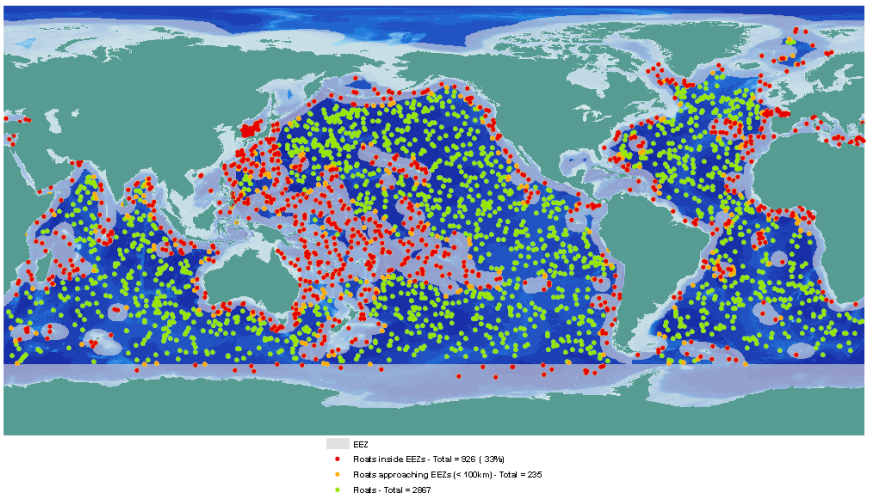
The true challenge for assembling a global deployment planning is human and not technical: the TC has to keep in contact with all float operators (75 different Argo programmes and contacts changing all the time), to explain them how it works and assist them in this process. The notification procedure now includes a draft mode to quickly edit records. Text files can be loaded directly on-line for large deployments. Operators can update their plans as required until all details (e.g. WMO ids) are ready for the formal notification.

A set of new products has been developed:

- A new web interface
- A new data layers for planning (interactive Map)
- A new monthly map for planning (see below)
- A new script developed to produce daily data layers for floats entering or approaching EEZs (see below)
- Daily (text/GIS files) exports of plans and EEZs monitoring



The floats displayed in the Antarctic are a "reserve" for which a deployment opportunity is yet to be indentified



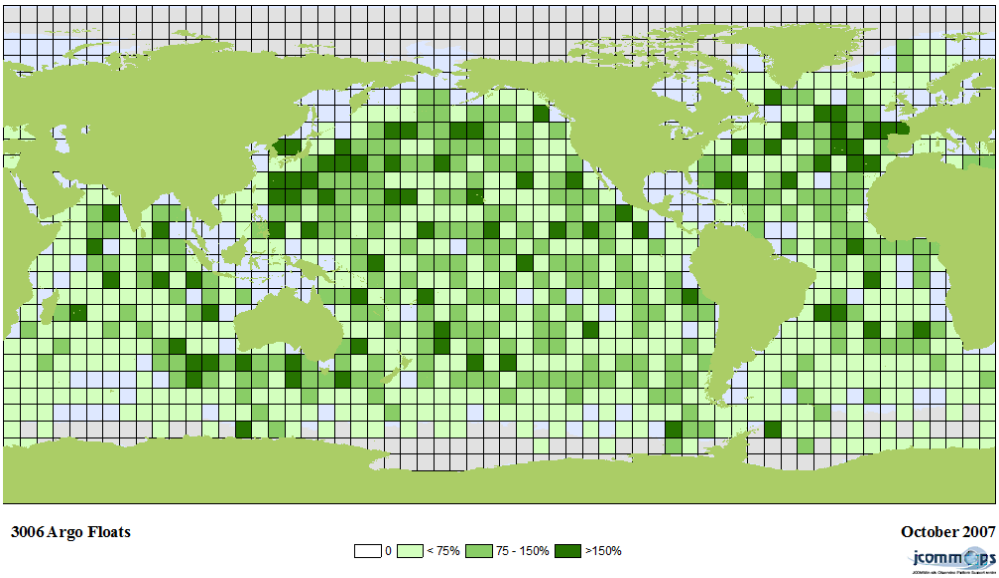
*The map shows that **30%** of the Argo array is operating within IOC Member States EEZs.*

- **Network Coverage**

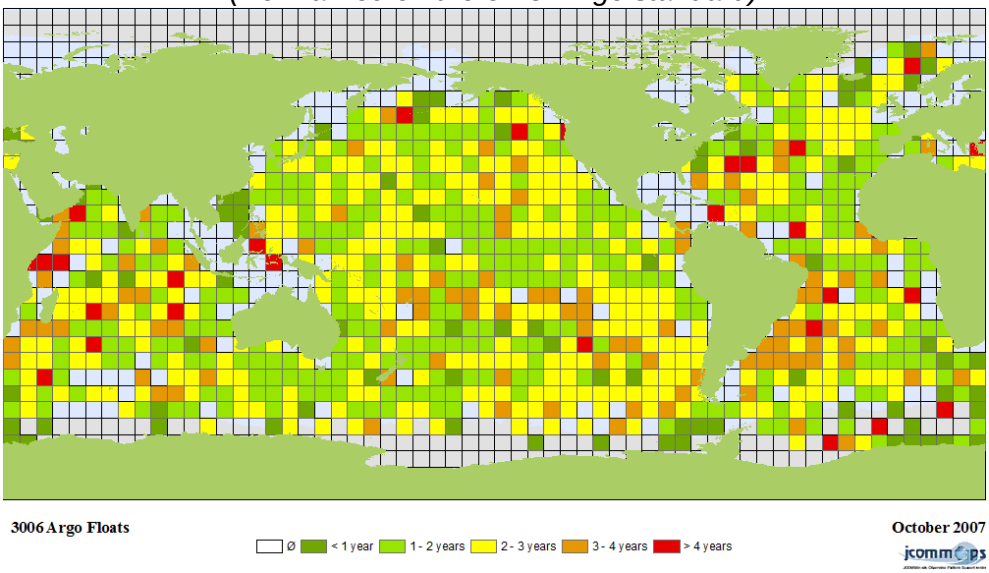
3 new data layers are available. They have been integrated in the web GIS and are used for monthly map production. (See below):

- Network density
- Network Age
- Network planned density

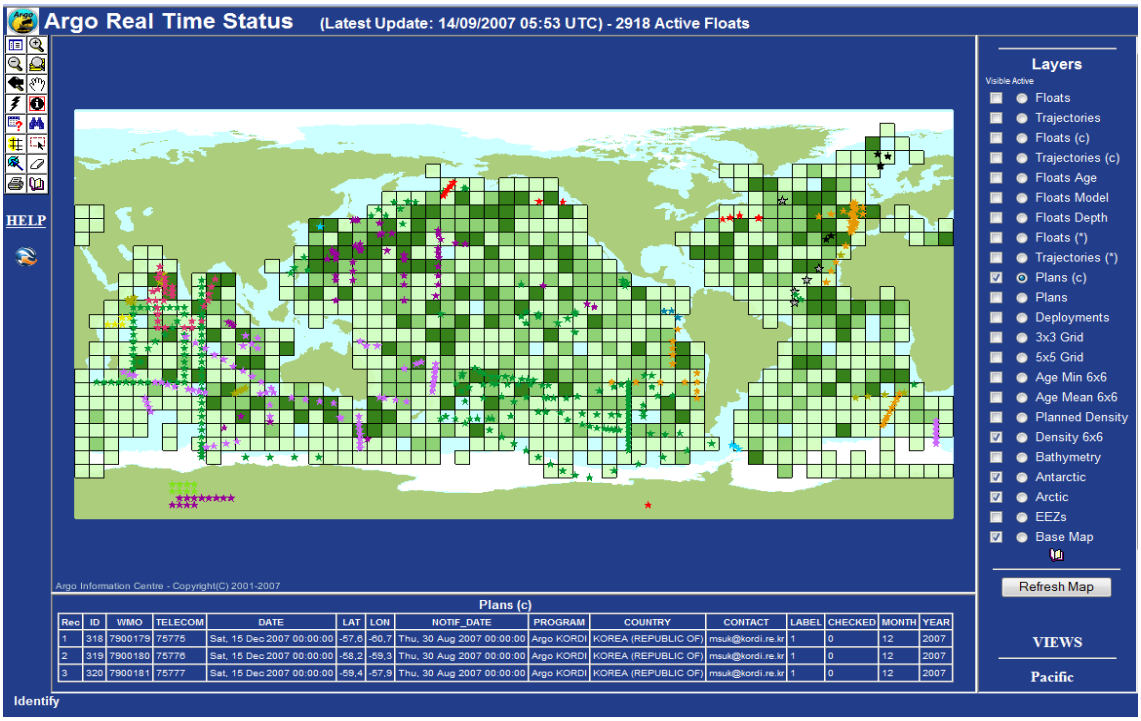
The cooperation of the TC DBCP in developing these new GIS data layers is gratefully acknowledged.



A simple view of the Argo network density which help in identifying gaps on a 6°x6° grid (Normalized on the 3°x3° Argo standard)



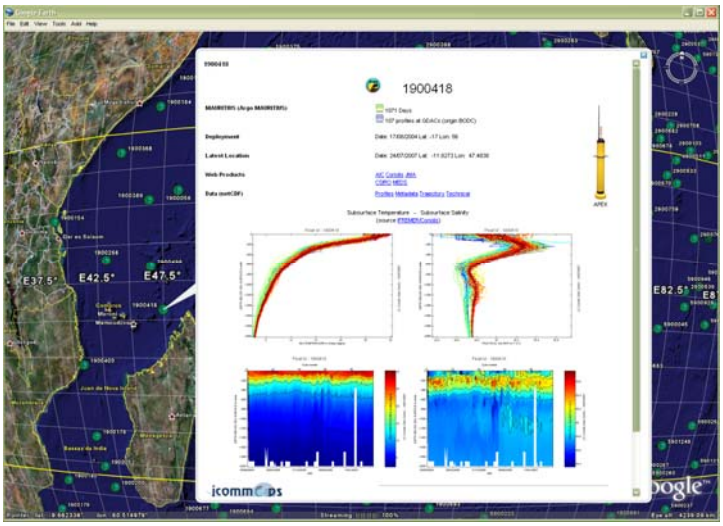
A simple view of the Argo network Age (Mean for 6°x6°) to anticipate future gaps



The Interactive Map permits overlays of all layers and optimize the deployment strategies of platform operators.
http://w4.jcommops.org/website/Argo

- **Google Earth**

The Argo KML files were substantially improved (see below) and now include data charts (produced by IFREMER), key metadata, links to all official data files (at GDACs), and links to national/regional websites proposing products for individual floats.
KML files are now served in a zipped format (KMZ) which is lighter to download but can still be read directly by GE.



This application is extremely useful for the tracking of beached floats and communication (e.g. live demonstration)
http://w3.jcommops.org/FTPRoot/Argo/Status/status.kmz
http://w3.jcommops.org/FTPRoot/Argo/Status/inactive.kmz

Misc. Website Updates:

- FAQs section reviewed (e. g. float retrieval issues)
- Documents section reviewed. Many documents, press releases, e-papers loaded.
- Pictures/Photos gallery enriched on the FTP site
- Argo Data Users survey results are available here (100 Argonauts replied).
- New mailing lists created (for trajectory files issues and Argo Regional Centres)
- Key Argo links and shortcuts added on the Argo toolbar
- Delayed-Mode operators contacts recorded
- New "Float of the month" section. Submit your float to Megan Scanderbeg at the Argo Project Office (mscanderbeg@ucsd.edu)
- Argo portal improved: http://www.argo.net

5. Data Management

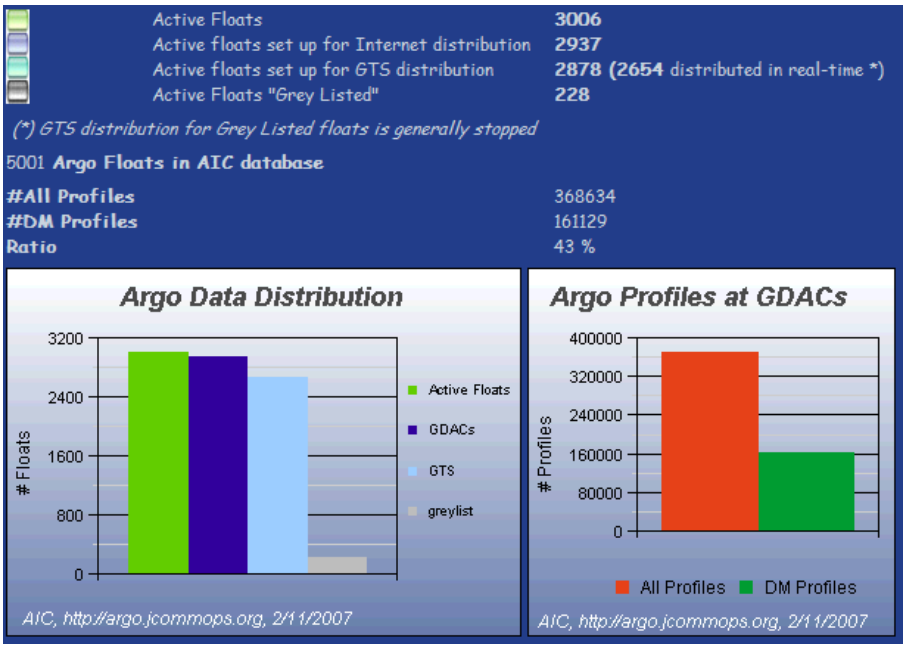
Float data distribution is verified at the AIC on GTS (daily + monthly stats from Meteo-France) and at Argo GDACs (daily stats from Ifremer).

As a consequence of this daily tracking (table and statistics are available on-line) and the monthly reports, the global Argo data distribution is almost perfect (see stats below): 98.8% of the Argo fleet distribute data as appropriate at a given time. The data managers are invited to keep an eye on the remaining 1.2% to not "waste" real time profiles used by operational centres.

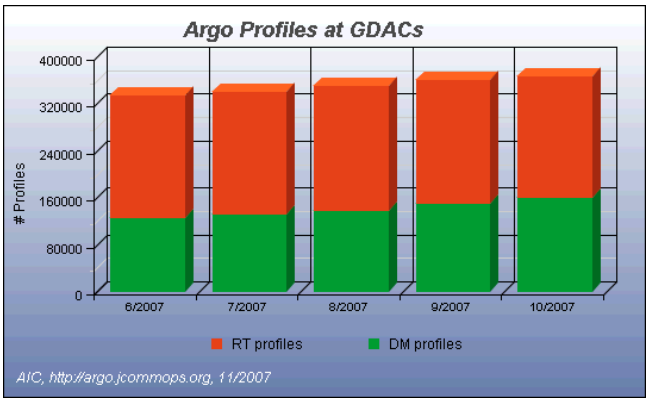
New developments:

- Daily update from Argo GDACs improved for delayed-mode files tracking.
- New dynamic charts for real-time and delayed mode Argo data distribution.
- Summary put in AIC Monthly Report (see annex)

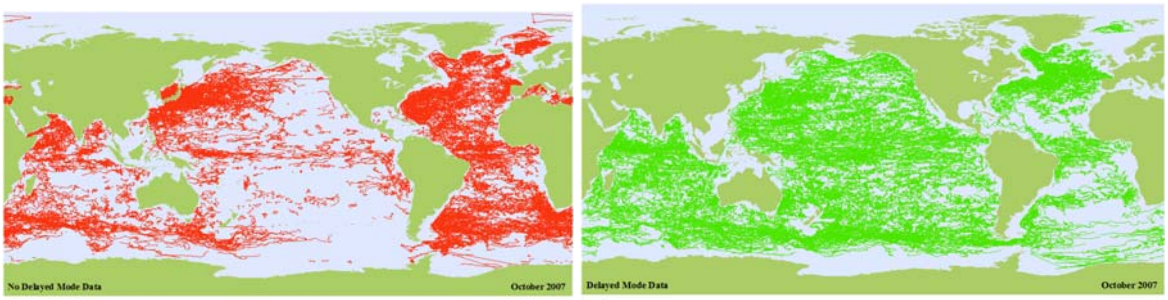
The following chart (website screenshot) summarizes the status of Argo data distribution.



A summary of the Argo data distribution status



This chart monitors the growth of delayed mode profiles distribution. It is available for all Argo and all Argo components (countries and programmes).

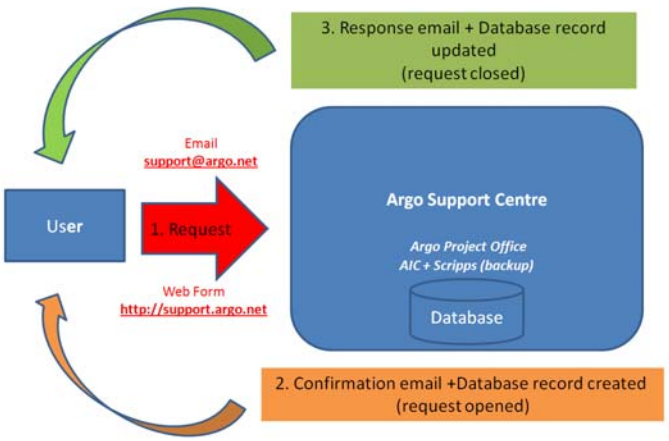


New monthly maps permit to check the geographical status of the DM data distribution. This information is available on the interactive Map too.

Argo Support Centre:

The Argo user community is growing and increasingly diverse.
The user support activities need to be strengthened and organized properly within the AIC.
Feedback from all project participants, from data users to data providers needs to be managed with a simple and efficient mechanism.

Part I: General support to users
In order to process the queries in a structured and timely mannered, a centralized procedure has been set up. The Argo Project Office (Argo TC + M. Scanderbeg / Scripps) provides an operational user desk via **http://support.argo.net** and **support@argo.net** (See below).



This procedure will permit archival of requests and generation of reports to the AST and the ADMT.

A few requests were already processed through this system (regarding general data access in ASCII, and /gts directory content).
The next Argo Newsletter will formally invite users to send their requests to support@argo.net .

Part II: Feedback from data users to data producers
This part will be developed in the coming months, after discussion at the upcoming ADMT (meeting on November 2007). If possible it will be integrated in the existing mechanism developed at JCOMMOPS for DBCP/SOT QC relay mechanism.

ADMT#7 Meeting Action List (for the AIC):

1) AIC to integrate MEDS statistics on GTS problems as well as Coriolis metadata check in the bi-monthly report – COMPLETED
2) AIC to implement and document a reliable Argo user desk behind the support@argo.net email to ensure that all request are processed and to provide history of the request to the ADMT and AST partners. STARTED (see above)
3) Promote the support@argo.net via the Argonautics newsletter, at GDAC at AIC when the system is in place. COMPLETED at AIC and argo.net
4) AIC to monitor the progress on reducing the GTS historical backlog. COMPLETED (see on-line and in monthly reports)
5) AIC to implement periodic statistics to measure the progress on Argo data management activities. COMPLETED (see on-line and monthly report)
6) More visibility to be provided to ARC from Argo WWW sites. COMPLETED (see AIC, argo.net, Argo toolbar)
7) AIC to monitor progress of trajectory files at GDACs. WAITING spec from “Trajectory group”
8) argo-dm-traj@jcommops.org mailing list to be set up by AIC. COMPLETED
9) AIC to identify the floats without delayed-mode operator. COMPLETED. (see on-line and monthly report)

6. International Issues

New participants

The AIC encourages and coordinates multilateral collaborations through “float donations” in order to build capacity for new participating countries, identify new deployment opportunities, and finally help to implement and maintain a global array.
The donation contract is still being reviewed by UNESCO lawyers.

This year the following programmes have been finalized thanks to the University of Washington Argo programme and with the WMO support:
Kenya: 5 floats transferred and to be deployed soon by the Kenyan Navy
Ecuador: 3 floats being transferred and to be deployed soon by the Ecuador Navy

Additionally, contacts have been established with the following countries:

- **Gabon**: Argo TC met Foreign Affairs minister. To follow up with a donor programme. Possibility to fund floats within a few years.
- **Morocco**: letter sent to different departments to organize a workshop to promote Argo, identify the partners ready to start an Argo programme and transfer floats from France and USA. Waiting official reply.
- **Ivory Coast**: to organize a donor programme. Ivory Coast established an Argo Centre and is waiting for floats. Formal request received from the "Centre de Recherches Oceanologiques" Director to participate in a donor programme.
- **Indonesia**: waiting for floats. Depl. opportunities identified in I.O and Banda Sea.
- **Cape Verde, Sri Lanka** helped to retrieve stranded floats: waiting for floats
- **Rep. Dominican**: waiting for floats.
- **Columbia**: letter sent by the AIC to help scientist to get funding for 4 floats from DIMAR/CCCP.
- **West African countries** (Argo Training Sessions).

Preparing the deployment of even a few units by a new country is a time consuming task (email + phone). It takes generally between one and two years.
The demand is increasing and difficult to satisfy in a timely manner.
The floats "in reserve" (see planning map) could be used as part of the donor programmes.

Retrieval of beached floats

This is an increasingly time consuming task. The Argo label affixed to most of floats has proven its worth. More and more "Samaritans" contact the AIC when they find a float.
The list of beached floats and the status of retrieval procedure is tracked on-line and in monthly report. About 50 floats are awaiting retrieval. About 30 units were successfully retrieved, secured and shipped back to their owner.
In many cases it is necessary to send a technician prior to the shipping, to prepare the instrument (in particular when instruments are equipped with Lithium batteries).
This provides an excellent opportunity to establish contacts in new regions and communicate on Argo to coastal communities.

Exclusive Economic Zones, Law of the Sea

The work of the IOC/ABE-LOS group is progressing.
The Argo TC participates in the work and provides a concrete example with the implementation of the IOC Resolution XX-6.
Argo is seen as a good example of an ocean observation programme, in particular regarding its transparency, and how it encourages international cooperation.
The AIC (and further JCOMMOPS) is being recognized as the ideal tool to inform Member States about deployment planning, platforms metadata and data access.
The notification procedure set up by the AIC could be recognized and formalized through a new Resolution.
As recalled in the documentation all Argo programmes should take care to:

- Designate a person (representing the Institution) to enter the deployment plans in the AIC website
- Regularly update the information
- Notify the plans when they are finalized
- Make sure that the information entered is correct

In addition to the web/email based notification procedure, letters (prepared by the AIC and sent by the IOC Executive Secretary) on the status of floats within or entering in the EEZs were sent to some IOC Member States. This will establish or re-confirm the formal contact for each Member State and possibly assist in updating the list of Argo National Focal Points.

7. Planning

Planning for 2007-2008 AIC activities can be summarized as follow:

- Continue to encourage float operators to notify of deployment plans
- Continue to address any issues with the new website
- Improve JCOMMOPS Information System operational status
- Improve the AIC Monthly Report
- Improve the Support Centre section I: “user desk”
- Develop the Support Centre section II: “feedback from data users to data producers”
- Continue to issue reports on EEZ status to IOC Member States
- Improve the Argo Portal www.argo.net
- Update Argo communication material: presentation, poster.
- Continue to assist in the float retrieval activities
- Continue to foster participation by new countries through donor programmes
- Finalize the Web Map Services (WMS) - prepare a guide and help page for users
- Create new daily layers for GE and Interactive Map
- Improve (modestly) Argo media coverage via direct contacts or educational initiatives
- Assist in the promotion of the 3000th float.

Annex: Latest AIC Monthly Reports

July 2007, **August 2007**, **September**, **October**