

Argo National Data Management Report of United States

September 15th, 2009 - September 26th, 2010

1. Status

- **Data acquired from floats deployed during the last year**

a) September 15th, 2009 - September 26th, 2010

Floats deployed: 294

Floats reporting: 261

Floats not reporting for more than 30 days: 33

Profiles quality-controlled: 71,282

b) 1997 to September 26th, 2010

Floats deployed: 3442

Floats failed on launch: 107

Floats reporting: 1667

Floats not reporting for more than 30 days: 1658

Profiles quality-controlled: 396,880

- **Data issued to GTS**

During the reporting period, Service Argos and AOML distributed 54,089 profiles to GTS. About 90% of the profiles were available in less than 24 hours.

Many of the profiles that were not available in less than 24 hours correspond to Iridium floats that were under ice.

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

During the reporting period, 71,282 real-time profiles, technical and trajectories netcdf files, as well as 294 new meta netcdf files have been issued to both GDACs.

Aproximately 214,100 NetCDF files were transmitted in total.

- **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 from two websites**

<http://www.aoml.noaa.gov/phod/sardac/products/index.php> currently shows four types of products that are derived from hydrographic profiles collected by Argo floats and other instruments:

a) Properties of the mixed layer (thickness, temperature and heat storage rate) as monthly fields.

b) Seasonal climatologies of temperature and salinity (maps, sections and scatter plots of

the profiles, for 30°S-40°S, provided by Ariel Troisi).

c) Maps and cross-sections that depict the annual mean state in the upper ocean.

d) 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.

- **Some tasks accomplished during the reporting year**

a) Decoding of Iridium floats from PMEL and University of Washington

b) Adjustment of parameter pressure in real time for APEX floats.

c) Implementation of a new automatic process to calculate the time elapsed between the profile date and the time when it reaches GDAC to monitor and assure the prompt distribution of the Argos data in the Global Data Centers.

d) Application of a new QC test to verify the accuracy of the date of the profile to detect if a float reports dates in the future.

d) Collaboration with both GDACs to decrease the numbers of duplicate profiles found in their databases using the automatic removal lists.

e) Calculation of JULD variable according to a new algorithm for APEX floats.

f) Implementation the results of Objective Analysis into Real time QC (in progress).

g) Implementation of the transmission of buffer files to GTS.

2. Delayed mode QC

Scripps Group:

Scripps Institution of Oceanography (SIO) has evaluated, as part of delayed-mode quality control (DMQC), a total of 79,106 Argo stations (profiles). This is an increase of approximately 15,250 stations (418 float years) since the previous United States Argo National Data Management Report (October, 2009). At present, 99.3% of the SIO stations which are eligible for DMQC processing have been completed. At AOML a station is defined as being DMQC eligible if it was sampled more than 12 months ago. The above numbers include stations from several Argo New Zealand floats for which SIO performs DMQC.

SIO expects to be able to continue to maintain a high DMQC completion percentage during the coming year and will continue to revisit most floats every 6 months.

The DMQC procedures for SOLO floats mentioned in past reports were continued into 2010. Updates to the Argo Climatological Dataset for OW salinity calibration were created quarterly throughout the year. Special effort was made over the year to the maintenance and reporting of data returned by “Microleak” floats which suffer from a strongly negative drifting Druck pressure sensor. In the SIO fleet, 50 such floats have been identified. These floats now have a higher than normal 3 month DM processing rotation in order to remove from the GDAC any uncorrectable data and to adjust correctable data as quickly as possible. All SIO Microleak floats went through the DM process and submitted to the GDAC in mid-September 2010. Although SIO SOLO floats

reset their pressure sensor each cycle, if the drift is of consistent sign and significant from one cycle to the next, a net bias results. Due to this bias, the “Microleak” floats do have the pressure values (and thus salinity) modified in DM processing.

A test float of the new generation SOLOII was deployed in February 2010. The SOLOII is similar to the present generation SOLO in most ways relevant to DM processing. Only minor modifications to the procedure are required, notably the rise rate, float cycle timing and surface displacement estimations. The test float returned 327 profiles over its 7 month life (approximately 14.5 hour cycle time). The addition of direct measurement and reporting of float timing information will add additional information into the Argo technical and trajectory files, over what was available from the SOLO. Moving forward over the next year it is expected that SIO will deploy increased numbers of SOLOII as the SOLO is phased out.

University of Washington Group:

As of September 2010, University of Washington had submitted 88,550 delayed-mode files to the GDACs via AOML. These comprised of:

- a) 82,177 D-files belonging to University of Washington, representing 87% of UW profiles older than 12 months.
- b) 6,373 D-files belonging to the KESS project from University of Hawaii, representing 54% of all UH KESS profiles.

A large part of the UW delayed-mode backlog during 2010 comes from Iridium floats, whose time series at the GDACs were discovered to be incomplete. The cause of this problem is being investigated, and delayed-mode processing of UW Iridium floats will resume as soon as their complete time series are restored.

During 2010, UW began performing delayed-mode processing for UH KESS floats in an effort to clear up some of the backlog from Argo-equivalent floats. This is a collaborative effort between Drs. Bo Qiu and Shuiming Chen from UH, and Annie Wong from UW.

Delayed-mode evaluation of conductivity sensor drift was done by using the statistical comparison method of OW (2009), in conjunction with the CTD reference database CTD_for_DMQC_2010v1, issued by Coriolis in February 2010. Visual comparison with nearby good Argo data was employed to complement the statistical method of OW. Results from Stephanie Guinehut’s altimetry test were also taken into account as part of the dmqc process.

PMEL group:

As of 11 October 2010, PMEL had a total of 37,267 D-files at the GDAC. Of these, 36,481 were more than one year old – 90% of the total of 40,526 PMEL profiles that were older than one year at that time. At the time that last year's report was written, PMEL had a total of 24,803 D-files at the GDAC. Of these 23,780 were more than one year old – 85% of the total of 27,879 PMEL profiles that were older than one year at that time. Thus, while not at 100%, we are ahead of our DMQC percentages from last year. We are able to

revisit DMQC for our floats on a roughly annual basis.

The PMEL float DMQC procedure currently consists of the following steps: We perform an automated correction, with visual check, of reported pressure drifts and correction for the effect of these pressure drifts on salinity, as well as an automated correction of conductivity cell thermal lag errors following Johnson et al. (2007). We do visual inspection and modification of quality control flags for adjusted pressure, temperature, and salinity using the SIO GUI. As of this summer, we now overwrite the raw Param QC flags during this step as required. We use OW Version1.1 with SeHyD_090408 as a historical database for recently deployed floats and adjust run parameters to get appropriate recommended salinity adjustments. We accept or reject the OW recommendations on the basis of comparison with nearly historical and Argo float profiles using the SIO GUI. We are continuing use of WJO Version2.0 instead of OW Version1.1 with most floats that began DMQC using the former system.

We have gone through all PMEL floats to identify and categorize runs of TNPD profiles for affected floats as well as suspected or confirmed microleakers. We have flagged and greylisted all suspected or confirmed microleakers as appropriate. Our next priority is to redo the flagging and add scientific comments as required for TNPD floats.

WHOI group:

Since Dec 1, 2009, WHOI has launched 70 Solo floats. Vessels used in the past year for deployment include R/V Knorr, R/V Endeavor, R/V Ron Brown, R/V Thomas Thompson, R/V Aurora Australis, R/V Akademik Vavilov, R/V Cruzeiro do Sul, SSV Corwith Cramer, M/V Safmarine Ngami, and M/V War Admiral.

WHOI currently has 373 active floats in the water. Of that number, 291 are equipped with SeaBird sensors while 82 are equipped with FSI CTDs which are returning unusable or questionable data.

As of Oct 12, 2010, Woods Hole has submitted 66571 delayed-mode profiles to the GDAC via AOML. Of the target group of profiles older than 12 months, 63239 delayed-mode profiles have been submitted representing 91% of the total of this group.

3. Argo Regional Center

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 Argo Regional Center

(<http://www.aoml.noaa.gov/phod/sardac>) provides background information, the report from the meeting with interested countries in May 2005, links to products and data servers.

Data consistency check is being performed for the SAARC region and a prototype web page with the results is available:

http://www.aoml.noaa.gov/phod/sardac/post_dmqc/delay_mode.html

Deployment opportunities 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 and provides regional data to the volunteers in participating countries.

Post-DMQC Analysis: Development of the Post-DMQC Analysis is near completion. The initial run of 498 floats in the SAARC region is currently being evaluated prior to being released to the community.