

Argo data management report 2019

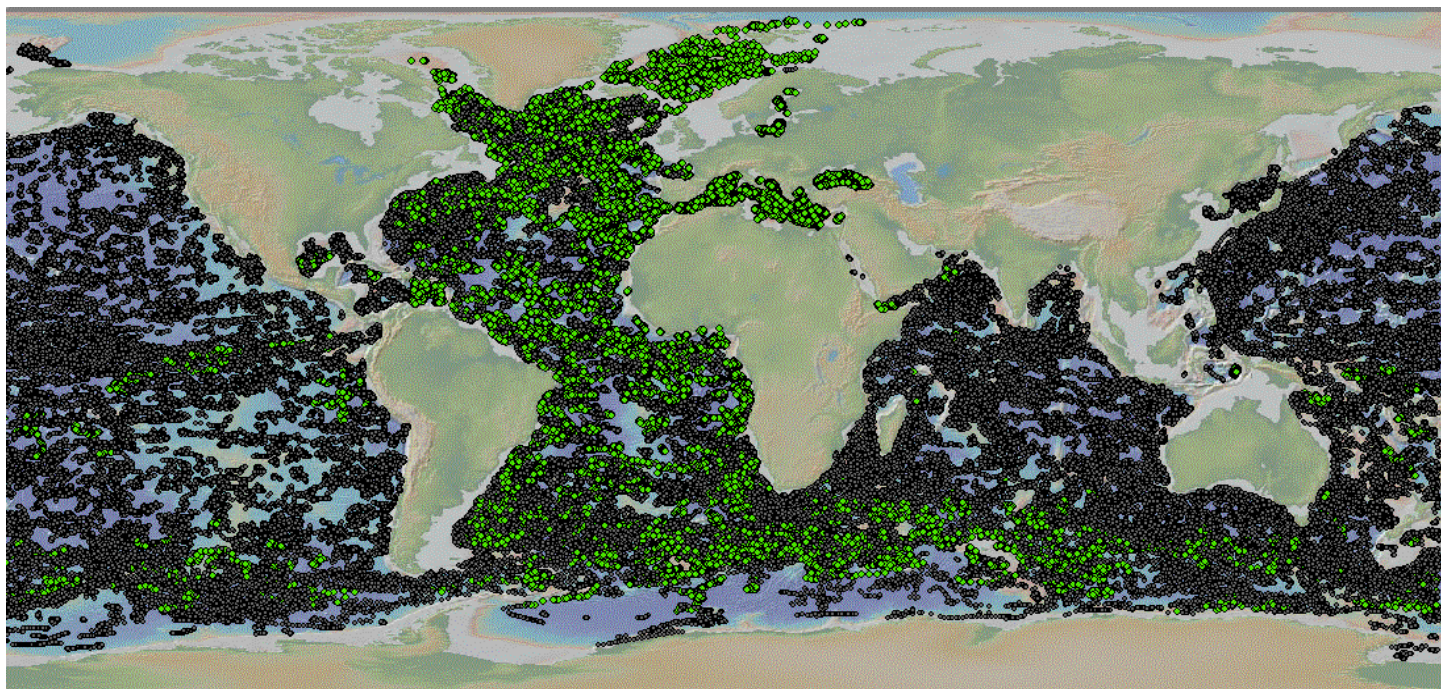
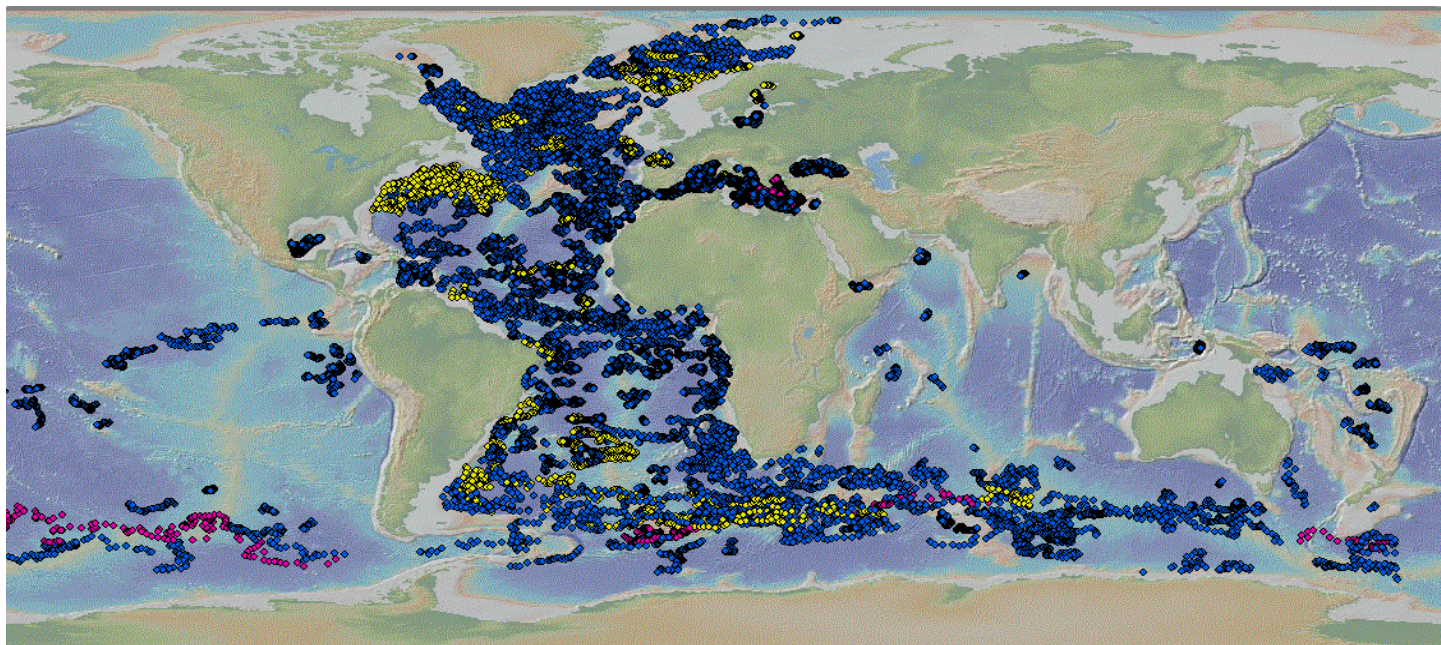
Coriolis DAC & GDAC

Data Assembly Centre and Global Data Assembly Centre

Annual report September 2019

Version 1.0

<https://doi.org/10.13155/69679>



1 DAC status

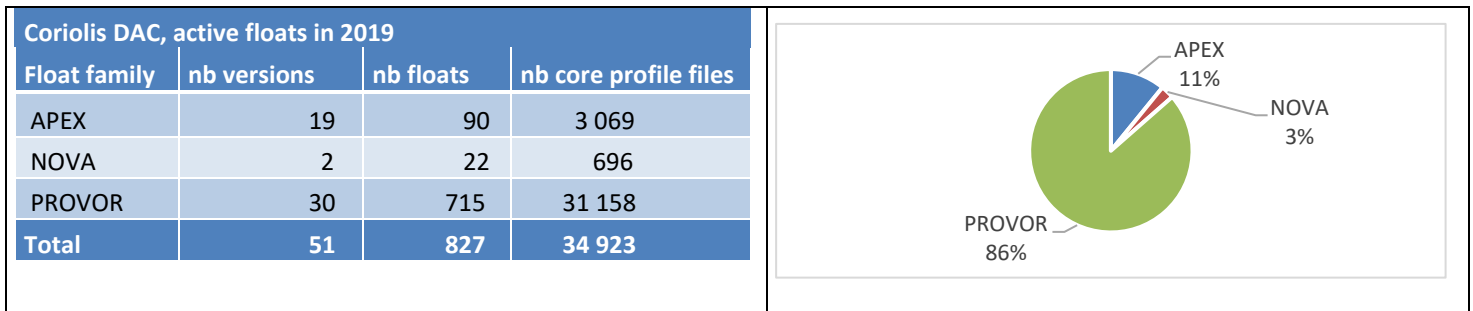
This report covers the activity of Coriolis data centre for a one-year period from July 1st 2018 to August 31st 2019.

1.1 Data acquired from floats

1.1.1 Active floats for the last 12 months

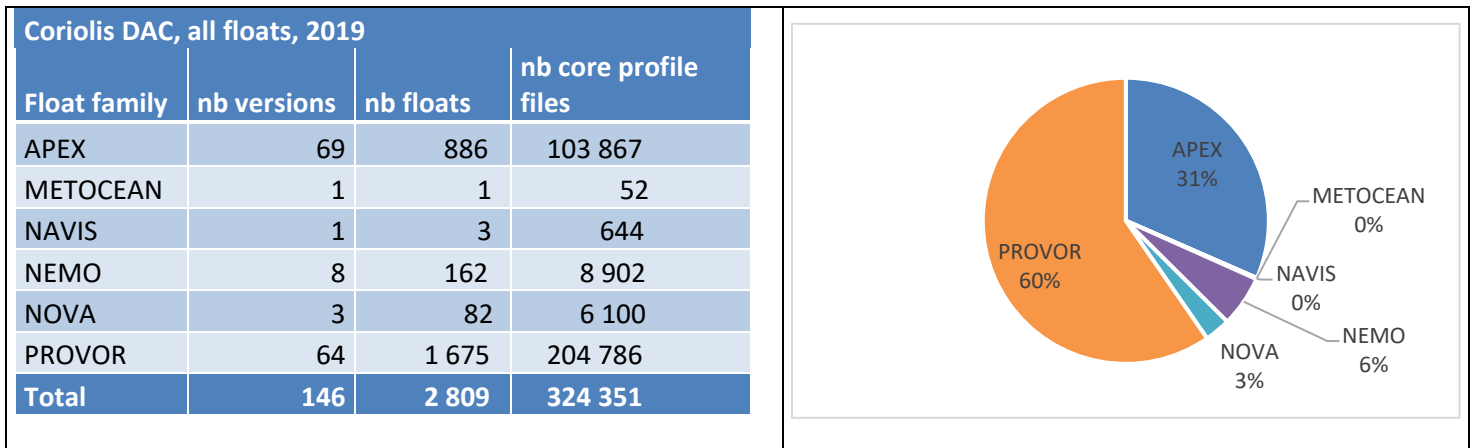
These last 12 months, **34.921 profiles from 827 active floats** were collected, controlled and distributed. Compared to 2018, **the number of profiles is significantly increasing (+15%), the number of floats increased by 4%**. These figures illustrate a good momentum in Coriolis DAC activity.

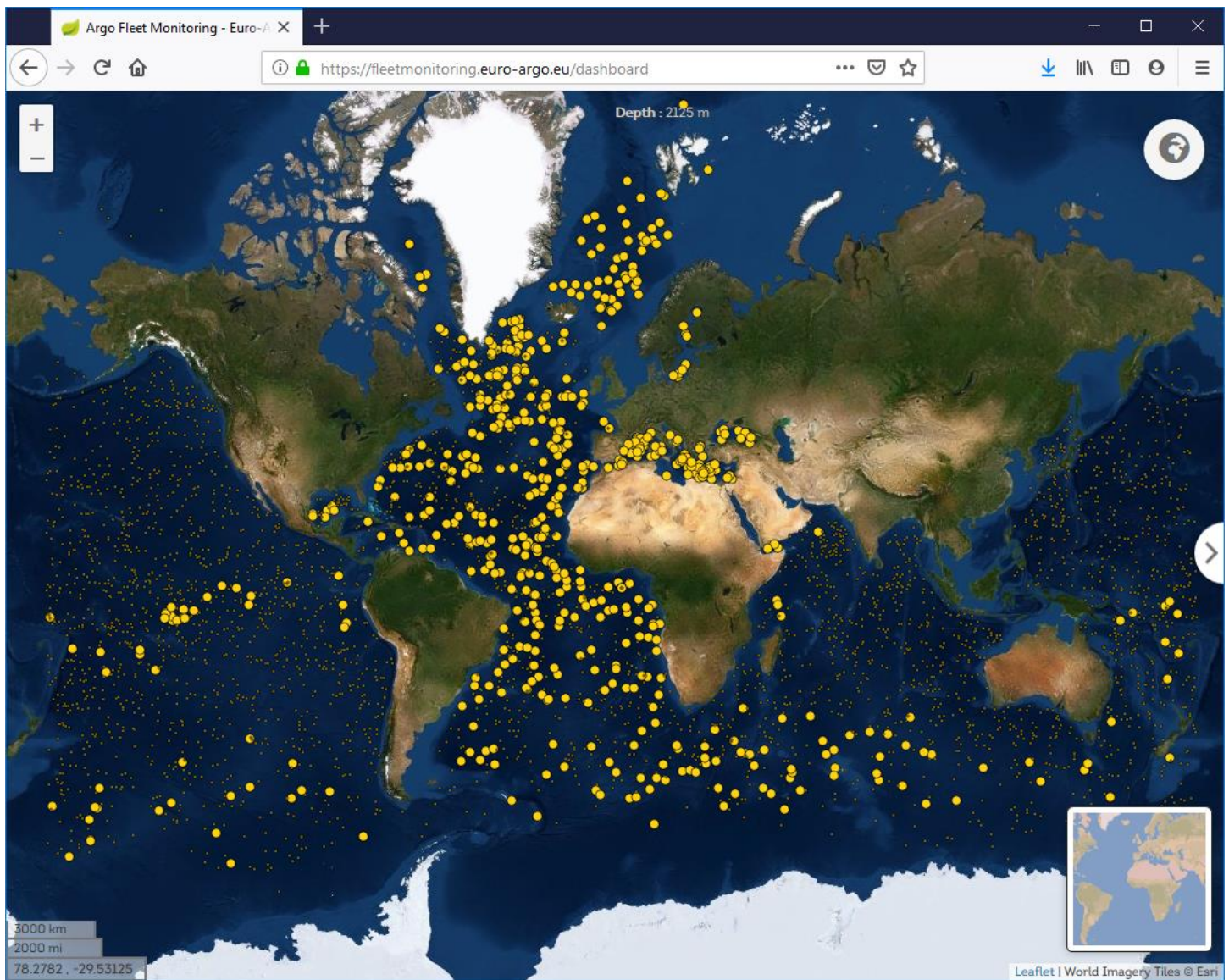
The 827 floats managed during that period had 51 versions of data formats.



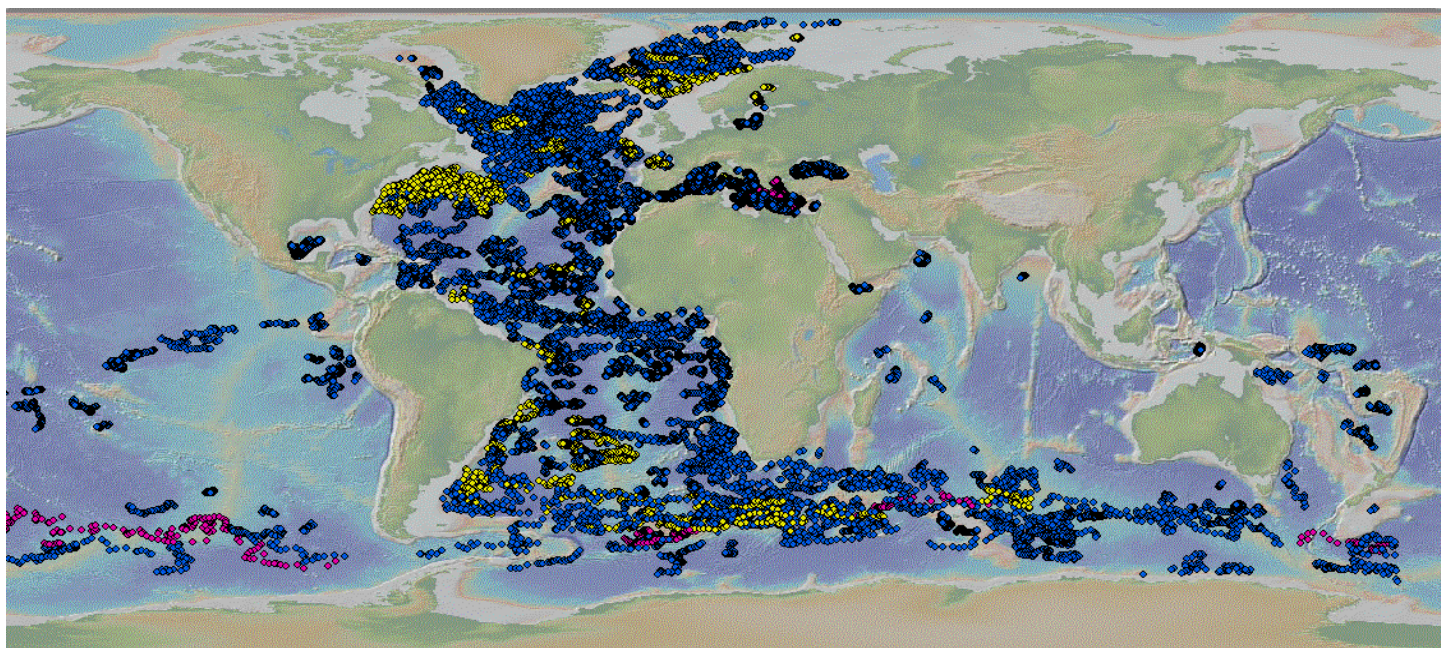
1.1.2 All floats managed by Coriolis DAC

Coriolis DAC manages a total of 2.809 floats with 146 versions, from 6 families. These floats reported 324.351 core Argo vertical profiles.



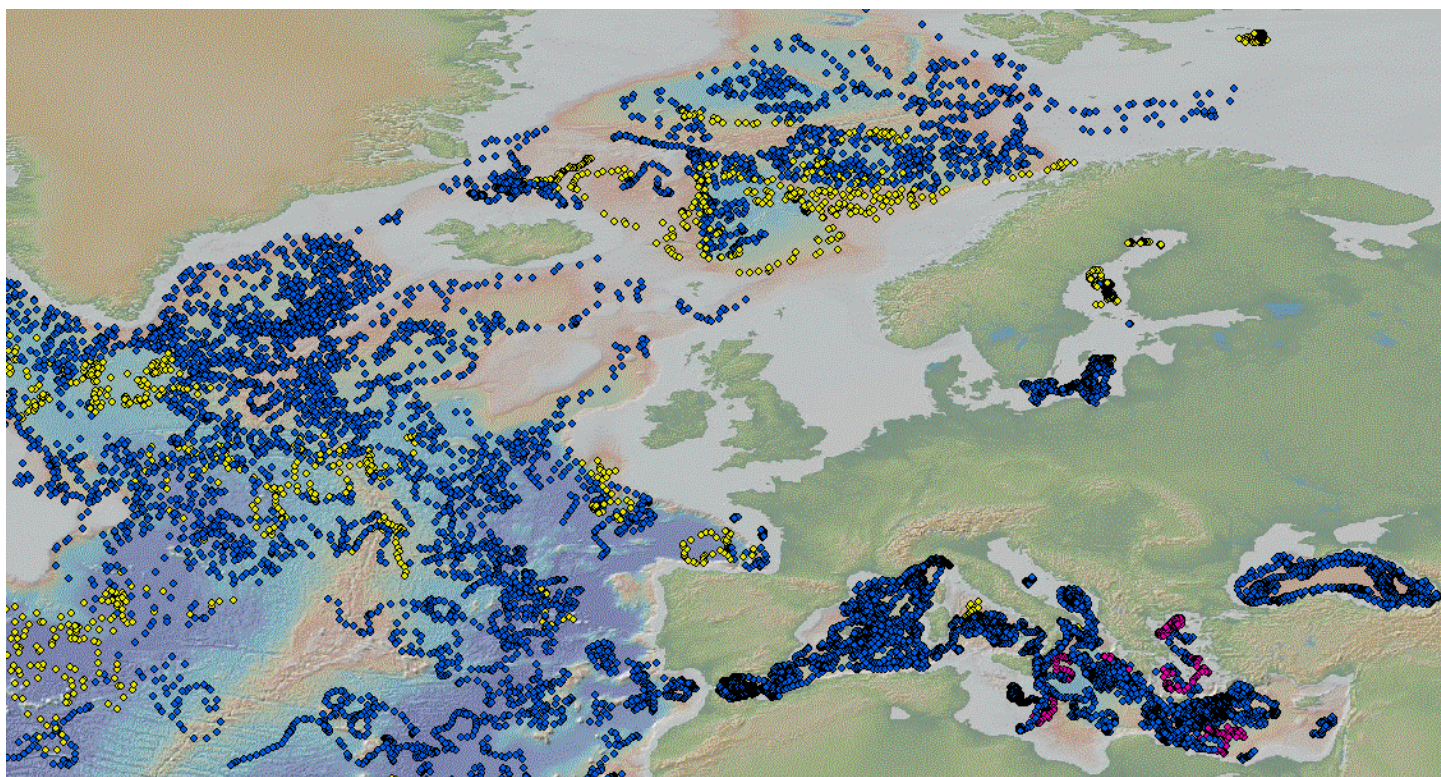


Map of the 827 active floats decoded by Coriolis DAC this current year, among others DACs (small dots)

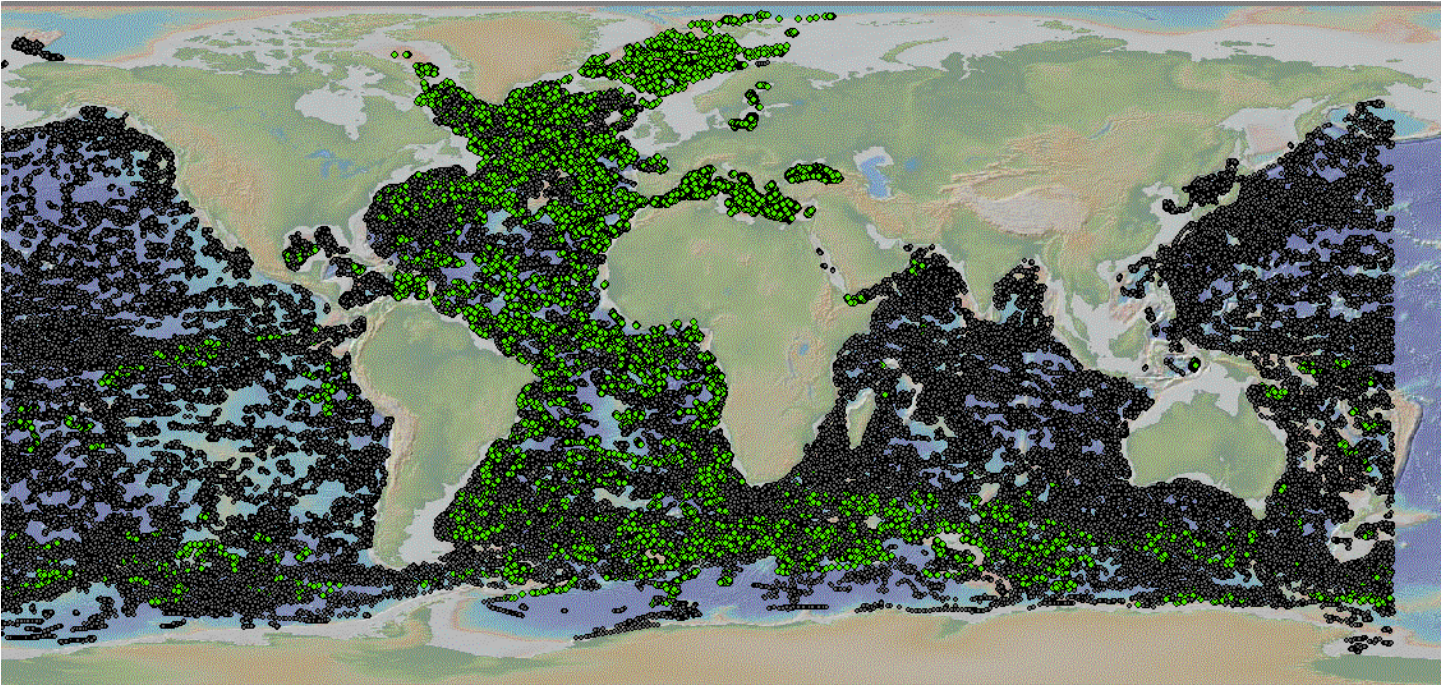


Map of the 34 923 profiles from 827 active floats decoded by Coriolis DAC this current year

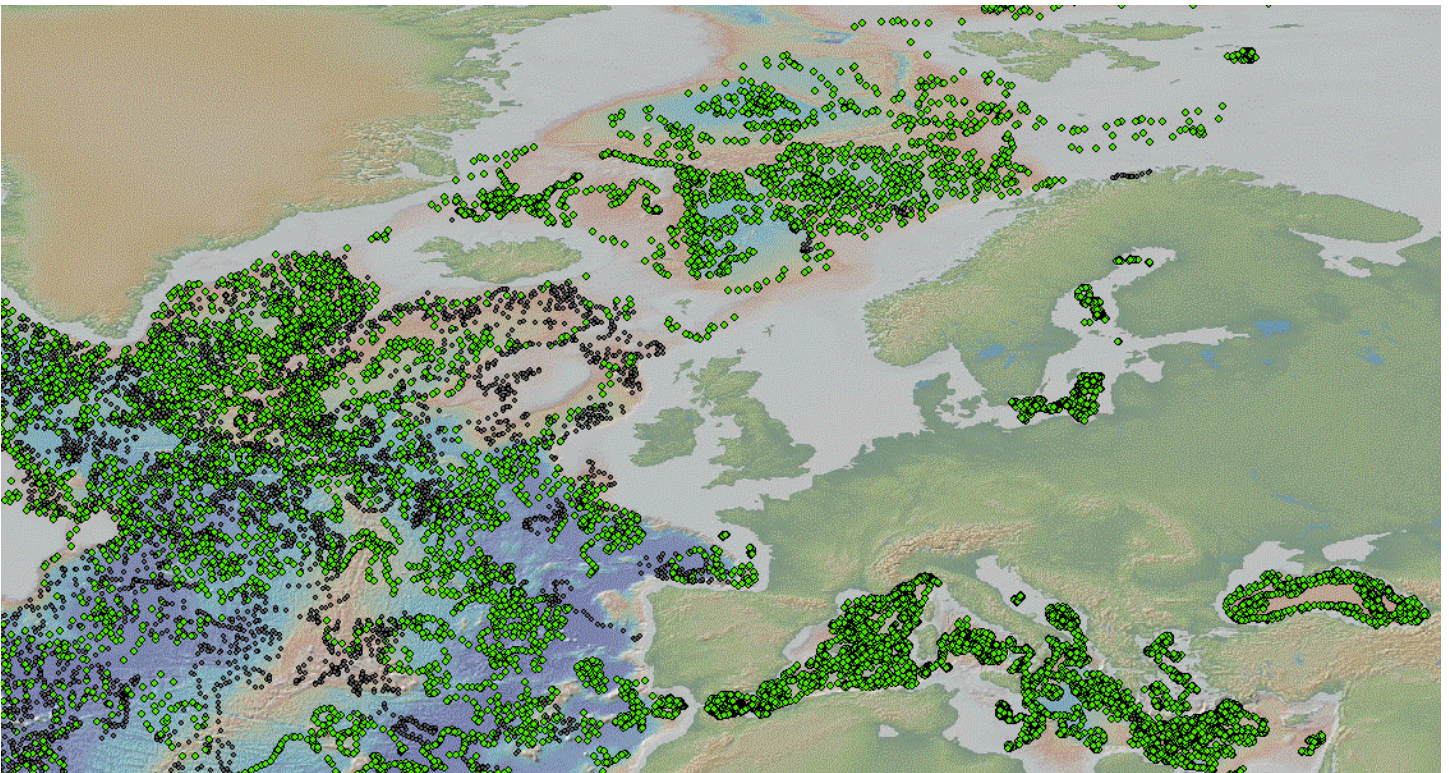
Apex Nova Provor



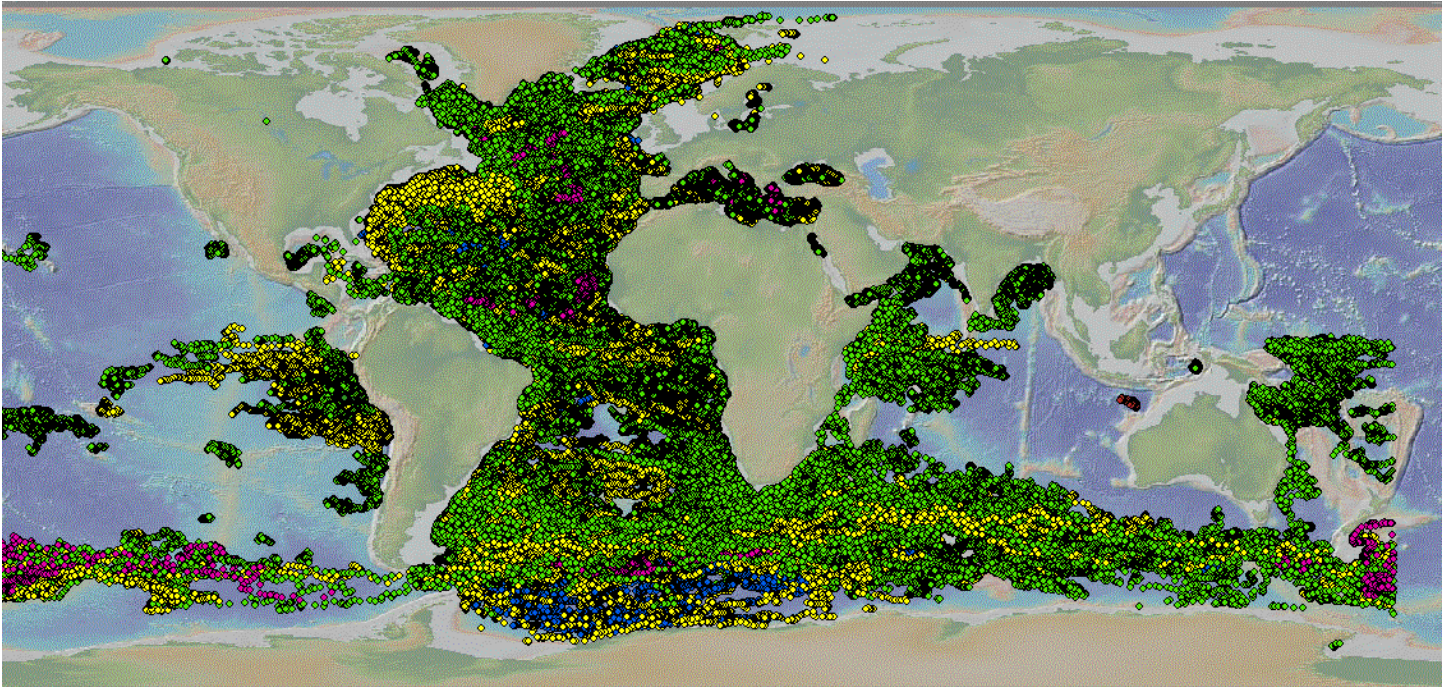
Map of active floats managed by Coriolis this current year, zoom on north Atlantic area



Map of the profiles from active floats decoded by Coriolis DAC this current year, among the other DAC's profiles (Coriolis: green, other DACs: grey)



Atlantic map active floats profiles from Coriolis DAC this current year, among the other DAC's profiles (Coriolis: green, other DACs: grey)



Map of the 295.351 profiles from 2.637 floats managed by Coriolis DAC

Apex Metocean Navis Nemo Nova Provor

1.1.3 BGC-Argo sensors on Coriolis floats

The data processing chain based on Matlab to manage data and metadata from Coriolis BGC-floats is continuously improved. These are advanced types of floats performing bio-geo-chemical (BGC) measurements.

Coriolis DAC manages 453 BGC-Argo floats from 4 families. They performed 63 634 cycles.

The data processing chain is freely available:

- Coriolis Argo floats data processing chain, <http://doi.org/10.17882/45589>

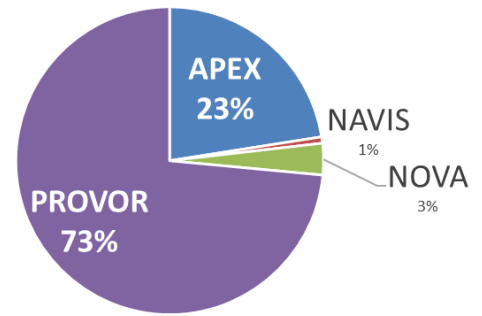
Oxygen data reprocessing

In 2019, the Oxygen manual was updated: “Processing Argo oxygen data at the DAC level cookbook”
<http://doi.org/10.13155/39795>

To implement the updates, all oxygen profiles were reprocessed during spring 2019. More than 42000 files containing oxygen data were resubmitted on the GDAC ftp server.

BGC-Argo floats processed by Coriolis DAC

Coriolis float family	nb floats	nb profiles
APEX	102	12 917
NAVIS	3	644
NOVA	15	1 055
PROVOR	333	49 018
Total	453	63 634



General characteristics

- Iridium sbd or rudics bi-directional communication or Argos
- Fourteen sensors are fitted on the floats
- Eleven BGC parameters reported

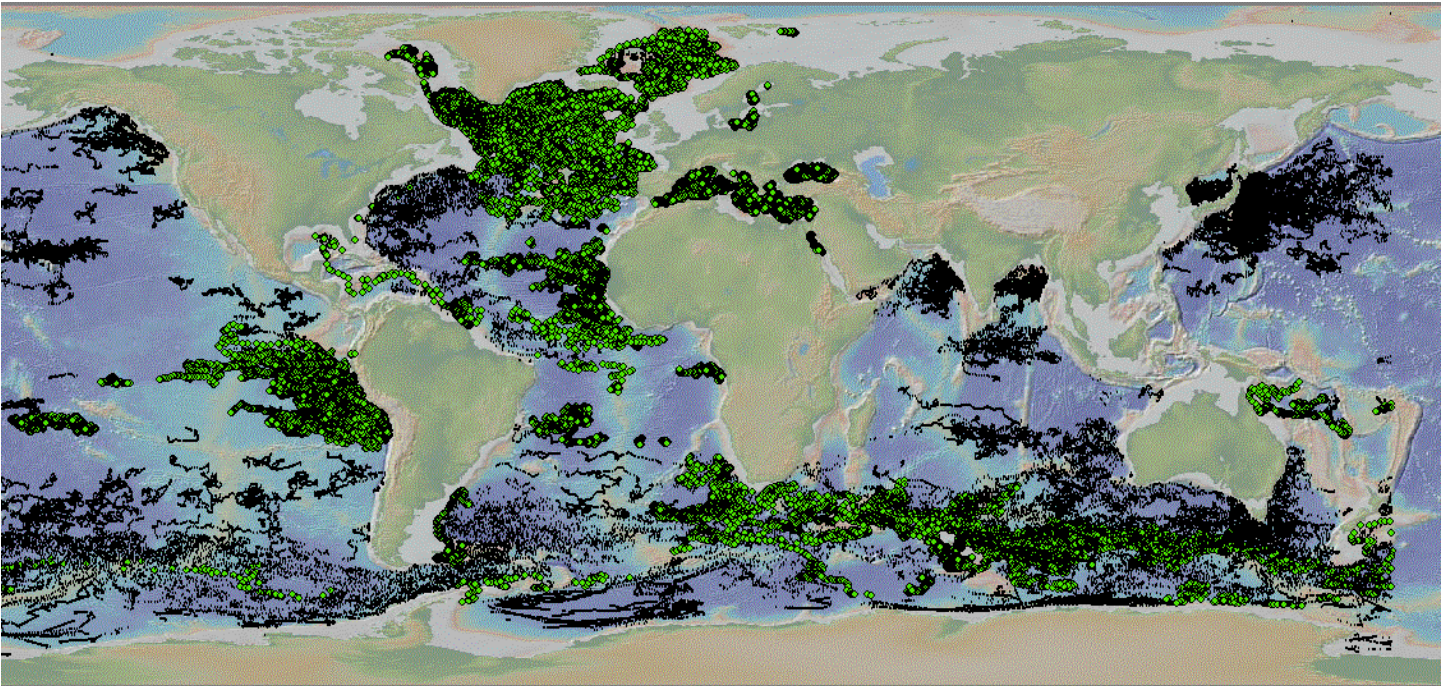
Coriolis BGC-Argo floats sensor	nb floats	nb profiles
AANDERAA_OPTODE_3830	66	9164
AANDERAA_OPTODE_4330	308	41613
AANDERAA_OPTODE_4330	1	21
C_ROVER	15	4449
ECO_FLBB_AP2	19	4982
ECO_FLBB2	163	89820
ECO_FLBB2	4	2112
ECO_FLNTU	10	5366
FLBB	2	616
SATLANTIC_OCR504_ICSW	166	120504
SBE41CP	246	77855
SBE43F_IDO	13	1596
SBE63_OPTODE	20	1885
SEAFET	8	409
SUNA_V2	73	10933
UVP6-LP	1	30

The 16 types of sensors mounted on Coriolis BGC-Argo floats

PARAMETER_CODE	NB_FILE
DOXY	53 538
CHLA	33 309
BBP700	31 200
DOWN_IRRADIANCE380	28 264
DOWNWELLING_PAR	28 264
CDOM	27 697

NITRATE	10 003
CP660	4 423
TURBIDITY	2 109
BISULFIDE	543
PH_IN_SITU_TOTAL	389

The 11 BGC parameters reported by Coriolis BGC-Argo floats



Map of the 453 BGC-Argo floats managed by Coriolis DAC (grey dots: the others DACs bio-Argo floats). They measure parameters such as oxygen, chlorophyll, turbidity, CDOM, back-scattering, UV, nitrate, bisulfide, pH, radiance, irradiance, PAR.



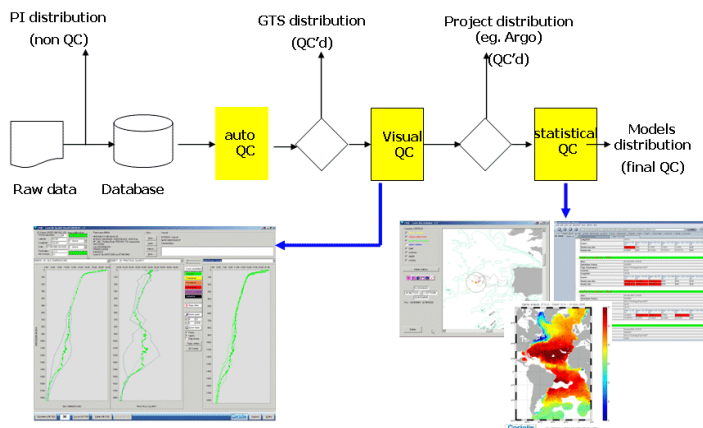
© Antoine Poteau, Observatoire Océanologique de Villefranche (CNRS/UPMC)
Deployments of a bio-argo Provor in Ligurian sea

1.2 Data issued to GTS

Vertical profiles processed by Coriolis are distributed on the GTS by way of Meteo-France. This operation is fully automated. After applying the automatic Argo QC procedure, the Argo profiles are inserted on the GTS every hour. The profile files are sent as BUFR messages.

Vertical profiles are distributed on GTS if they are less than 30 days old. Once a day, floats data are checked with ISAS objective analysis that triggers alerts and visual inspection for suspicious observations. The corrected data are not redistributed on GTS.

In July 2019, Coriolis stopped the TESAC messages distribution; only BUFR messages are now distributed.



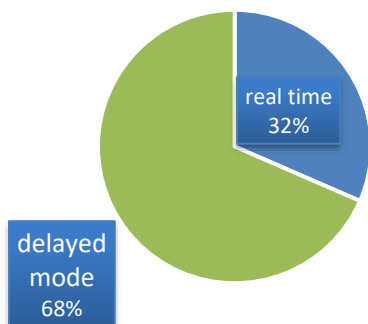
Coriolis DAC Argo data flow

1.3 Data issued to GDACs after real-time QC

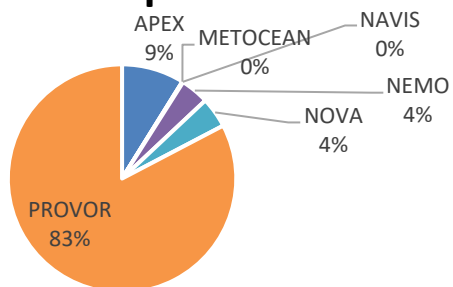
All meta-data, profiles, trajectory and technical data files are sent to Coriolis and US-GODAE GDACs. This distribution is automated.

All Coriolis floats, number of profile files on GDAC				
Family	nb floats	nb profiles	RT profiles	DM profiles
APEX	887	103964	9085	94879
METOCEAN	1	52	0	52
NAVIS	3	644	123	521
NEMO	162	8902	4128	4774
NOVA	82	6115	4421	1694
PROVOR	1677	205455	84734	120721
Total	2 812	325 132	102 491	222 641

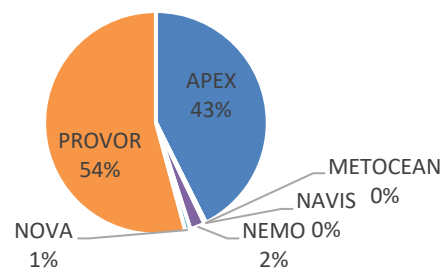
Profiles real time/delayed mode ratio



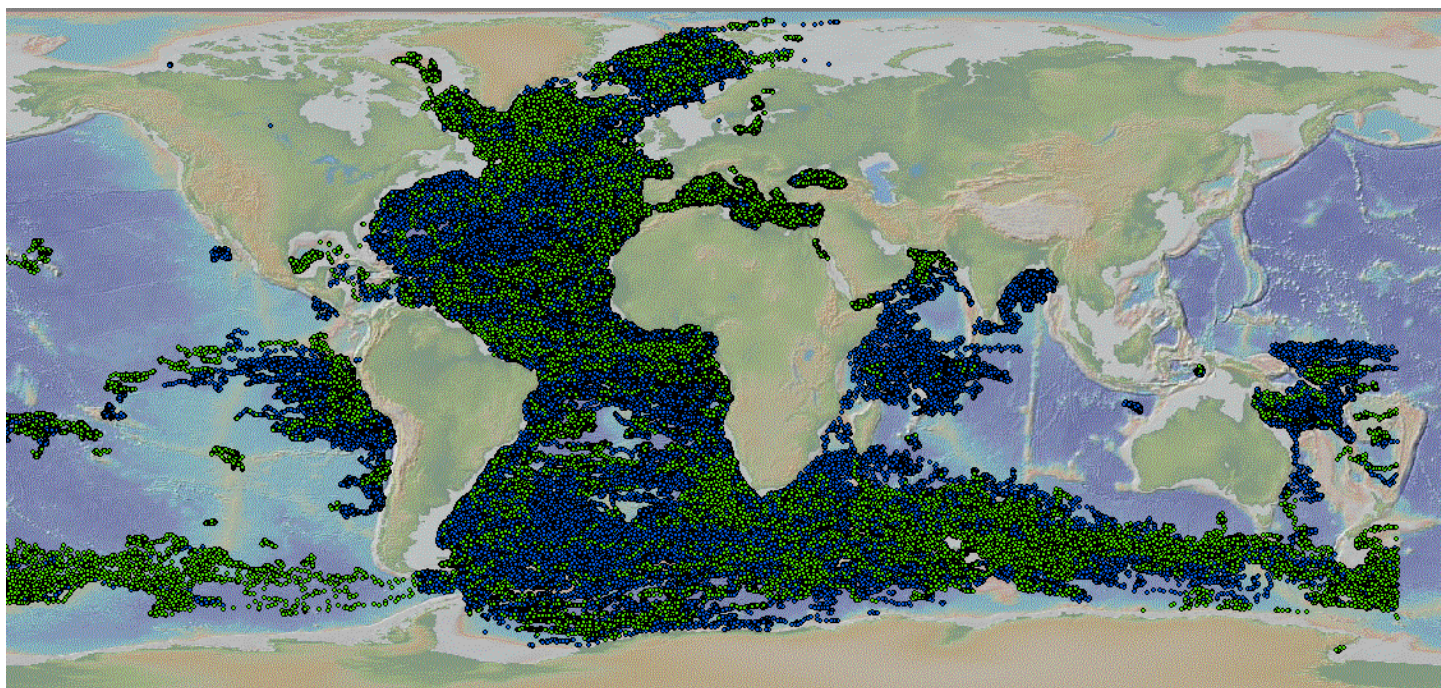
real-time profiles



delayed mode profile



Distribution of Coriolis DAC real-time and delayed mode profiles (102.491 profiles – 222.641 profiles)



Map of real-time profiles and delayed mode profiles
Real time: green dots, delayed mode: blue dots

1.4 Data issued for delayed mode QC

Delayed mode profiles

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

1.5 Delayed mode data sent to GDACs

An Argo delayed mode profile contains a calibrated salinity profile (psal_adjusted parameter).

- A total of **115.892 new or updated delayed mode profiles** was sent to GDACs this year.
- A total of **222.641 delayed mode profiles** were sent to GDACs since 2005.

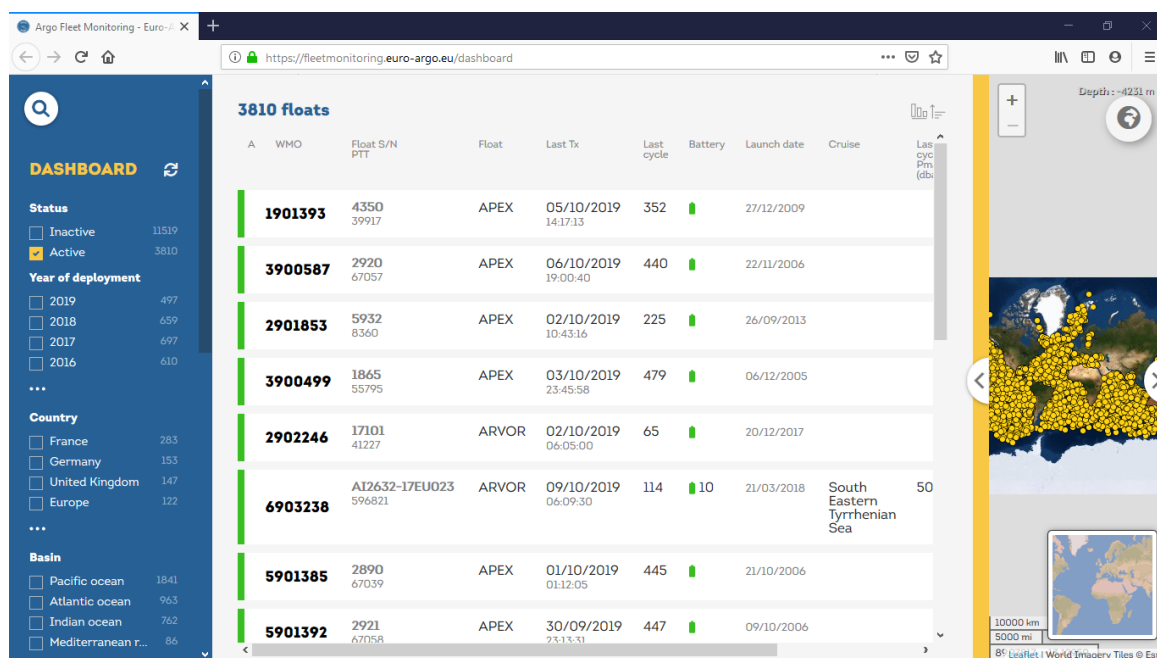
The number of delayed mode profiles increased by 11% this year.

1.6 Web pages

1.6.1 Argo dashboard

The Argo floats dashboard developed in 2019 by Coriolis team is available at:

- <https://fleetmonitoring.euro-argo.eu/dashboard>



It displays all Argo floats, with faceted interrogations and instantaneous answers. The dashboard is developed on cloud and big-data techniques.

- Cloud techniques: a metadata and a data APIs, opened to internet machine to machine queries
- Big-data techniques: Argo metadata are hourly indexed in an Elasticsearch index, Argo data are hourly indexed in a Cassandra data base. Elasticsearch and Cassandra allows instant answers on dataset having billions of observations.

1.6.2 Argo data on EU BlueCloud

A collaboration is underway with NASA-JPL and the European Blue Cloud to use the CMC (Common Mapping Client) client as the front office of Argo dashboard to provide in situ – satellite – model integration.

- <http://bluecloud.ifremer.fr>

1.6.3 Interoperability services (ERDDAP API,...)

This web page describes all Argo floats interoperability services from Coriolis:

- <http://www.coriolis.eu.org/Data-Products/Data-Delivery/Argo-floats-interoperability-services2>
 - Argo data through ERDDAP data server (www.ifremer.fr/erddap)
 - Display an individual float's data and metadata in HTML or XML format

- Display all Argo floats, display a group of floats
- Argo profiles and trajectories data selection (HTML or XML)
- All individual float's metadata, profile data, trajectory data and technical data
- Argo profiles data on OpenDAP, OGC-WCS and http
- Argo data through Oceanotron data server
- Argo profiles data through GCMD-DIF protocol
- Argo data through RDF and OpenSearch protocols
- Display Argo profiles and trajectories with GoogleEarth

1.6.4 Data centre activity monitoring

Coriolis operators perform an activity monitoring with an online control board.

The screenshot shows a web browser window with the address bar displaying 'www.ifremer.fr/co-tbo/?theme=CORIOLIS&category=COARG'. The page title is 'Thème : CORIOLIS'. The main content is a table with the following columns: 'Fonction', 'Description', 'Etat J', 'Etat J-1', 'Etat J-2', 'Etat J-3', and 'Dernière exécution (TU)'. The table lists various functions related to Argo GDAC operations, such as 'Archive GDAC Argo', 'Argo files controller', 'Argo grey list diffuser', 'Argo stat controller', and several 'Collecte Argo DAC' tasks for different parameters like 'EDAC', 'FTP', 'Table argo index profiles', 'aoml', 'bodc', 'coriolis', 'csio', 'csirop', 'incois', 'jma', 'kma', 'kordi', 'meds', 'nmdis', 'BDD - aoml', and 'BDD - bodc'. The status columns show green circles (OK) or orange/red circles (warning/error) for the previous days. The last execution time is provided for each function.

Fonction	Description	Etat J	Etat J-1	Etat J-2	Etat J-3	Dernière exécution (TU)
CO-05-08-08	Archive GDAC Argo					UNDERWAY-LOCKED 2017-11-25T02:07:01Z
CO-03-07-01	Argo files controller					OK 2017-10-13T08:00:46Z
CO-05-08-11	Argo grey list diffuser		●	●	●	OK 2017-11-24T11:05:02Z
CO-03-07-01-02	Argo stat controller				●	OK 2017-11-22T01:02:21Z
CO-01-07-08	Collecte Argo Coriolis EDAC	●	●	●	●	OK 2017-11-25T09:45:04Z
CO-01-07-03	Collecte Argo DAC - FTP	●	●	●	●	OK 2017-11-25T10:09:04Z
CO-01-07-01-02	Collecte Argo DAC - Table argo index profiles	●	●	●	●	OK 2017-11-25T09:58:50Z
CO-01-07-01-aoml	Collecte Argo DAC - aoml	●	●	●	●	OK 2017-11-25T10:00:04Z
CO-01-07-01-bodc	Collecte Argo DAC - bodc	●	●	●	●	OK 2017-11-25T10:01:02Z
CO-01-07-01-coriolis	Collecte Argo DAC - coriolis	●	●	●	●	OK 2017-11-25T10:02:21Z
CO-01-07-01-csio	Collecte Argo DAC - csio	●	●	●	●	OK 2017-11-25T10:03:02Z
CO-01-07-01-csirop	Collecte Argo DAC - csirop	●	●	●	●	OK 2017-11-25T10:04:03Z
CO-01-07-01-incois	Collecte Argo DAC - incois	●	●	●	●	OK 2017-11-25T10:05:02Z
CO-01-07-01-jma	Collecte Argo DAC - jma	●	●	●	●	OK 2017-11-25T10:06:05Z
CO-01-07-01-kma	Collecte Argo DAC - kma	●	●	●	●	OK 2017-11-25T10:07:03Z
CO-01-07-01-kordi	Collecte Argo DAC - kordi	●	●	●	●	OK 2017-11-25T10:08:02Z
CO-01-07-01-meds	Collecte Argo DAC - meds	●	●	●	●	OK 2017-11-25T10:09:03Z
CO-01-07-01-nmdis	Collecte Argo DAC - nmdis	●	●	●	●	OK 2017-11-25T10:10:02Z
CO-01-07-06-aoml	Collecte Argo DAC BDD - aoml	●	●	●	●	OK 2017-11-25T09:42:07Z
CO-01-07-06-bodc	Collecte Argo DAC BDD - bodc	●	●	●	●	OK 2017-11-25T09:42:03Z

Argo GDAC operations monitoring: every working day, an operator performs diagnostics and take actions on anomalies (red or orange smileys)

1.7 Statistics of Argo data usage (operational models, scientific applications, number of National Pis...)

Operational oceanography models; all floats data are distributed to:

- EU Copernicus Marine service models (Mercator, Foam, Topaz, Moon, Noos, Boos)
- French model Soap (navy operational model)

Argo projects: this year, Coriolis data centre performed float data management for **79 Argo scientific projects and 51 PIs (Principal Investigators)**.

List of Coriolis scientific PIs and project names

project	nb floats
euro-argo	296
coriolis	277
argo-bsh	181
naos	136
mocca	120

argo italy	43
pirata	32
remocean	31
argo-italy	28
argo spain	26

Top 10 of Coriolis DAC projects having active floats

Other projects having active floats:

pi	nb active floats
birgit klein	182
pierre-marie poulain	94
christine coatanoan	87
virginie thierry	59
sabrina speich	49
bernard bourles	35
pedro velez	29
romain cancouët	26
herve claustre	22
fabrizio d'ortenzio	19

Top 10 of Principal Investigators (PI) in charge of active floats

List of Principal Investigators (PI) in charge of active floats:

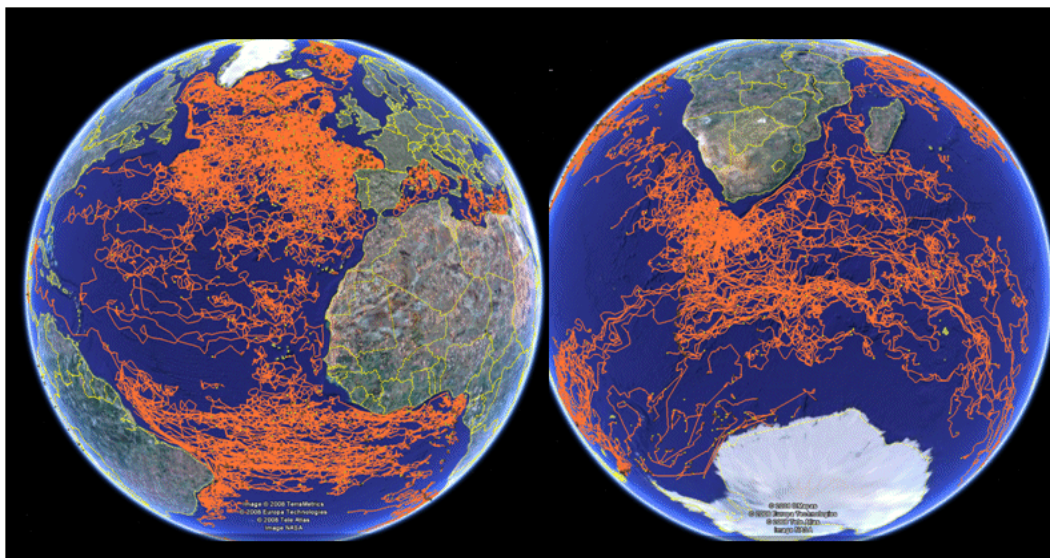
goodhope, asfar, rrex asfar, atlantos, gmmc_cnes, gmmc ovide, norargo, argo greece, argo poland, bwr, gmmc, narval, dap, mocca-germany, outpace, argo-finland, geovide, gmmc argomex, gmmc moana maty, gmmc perle, moose, rrex, argo italy , morsea, cienperu, gmmc oblady, soclim, amop, argo norway, aspex, mafia, mocca-italy, mocca-poland, naos-france, ticmoc, vsf, argo bsh, argo_fin, brazilian navy argo program, mocca-ger, norway-bgc-argo, argo italy,calypso 2019, argomed, bide, capricorn, mocca-eu, dekosim (metu), naos-canada, norargo2, argo bulgary, argo finland, argo italy , adri19_01, argo italy , moma, argo italy , perle2, argo italy, calypso 2019, argo_finland, argo_spain, argo-norway, bioargo italy, bioargo-italy, calypso, eaims, euroargo, greek argo, lov-atlantos, mocca-ned, mocca-netherlands, naos,pirata, ovide 2018, perseus, sagar

1.8 Products generated from Argo data

Sub-surface currents ANDRO Atlas

Based on Argo trajectory data, Ifremer and CNRS team are regularly improving the “Andro” atlas of deep ocean currents. The ANDRO project provides a world sub-surface displacement data set based on Argo floats data. The description of each processing step applied on float data can be found in:

- Ollitrault Michel, Rannou Philippe (2019). **ANDRO: An Argo-based deep displacement dataset**. SEANOE. <http://doi.org/10.17882/47077>



Argo trajectories from Coriolis DAC are carefully scrutinized to produce the “Andro” atlas of deep ocean currents.

2 Delayed Mode QC

(Please report on the progress made towards providing delayed mode Argo data, how it is organized and the difficulties encountered and estimate when you expect to be pre-operational.)

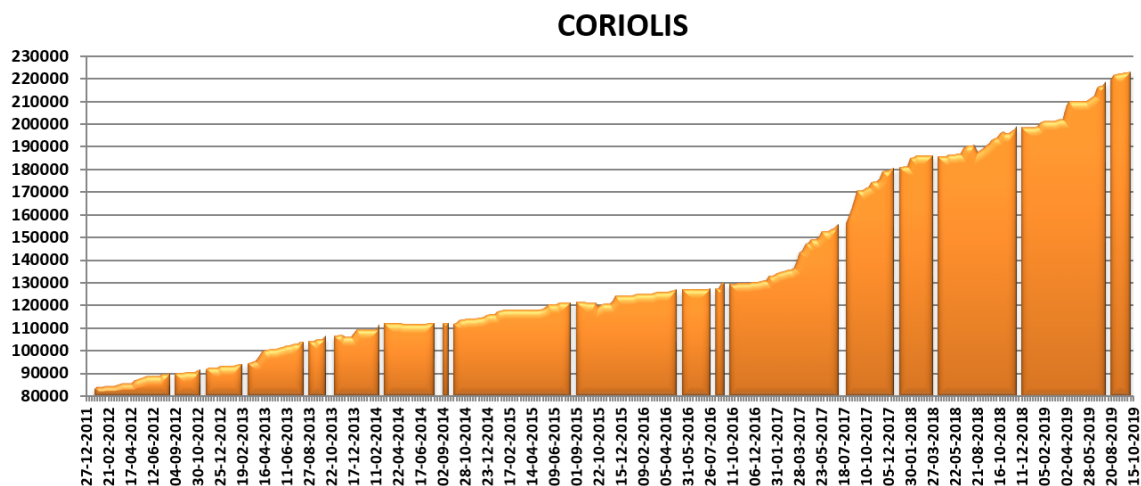
At the Coriolis data centre, we process the delayed mode quality control following four steps. Before running the OW method, we check carefully the metadata files, the pressure offset, the quality control done in real time and we compare with neighbor profiles to check if a drift or offset could be easily detected. As each year, we have worked on this way with PIs to strengthen the delayed mode quality control.

Some floats have been deployed from some projects, meaning a lot of PIs and a lot of time for explaining the DM procedure to all of them. A few PIs are totally able to work on DMQC following the four steps but this is not the case for most of them. Since the unavailability of the PIs leads to work by intermittence and then extend the period of work on the floats, we did the work with a private organism (Glazeo) to improve the realization of the DMQC, exchanging only with the PIs to validate results and discuss about physical oceanography in studied area. Working in this way, we largely improve the amount of delayed mode profiles.

For a few projects, there are still no identified operators to do DMQC, for instance the first run has been done by students which have now left institutes or are not available to carry on with this work. We have made a lot of progress with BSH (Birgit Klein) taking into account also floats from other German institutes and OGS (Giulio Notarstefano) for the MedSea.

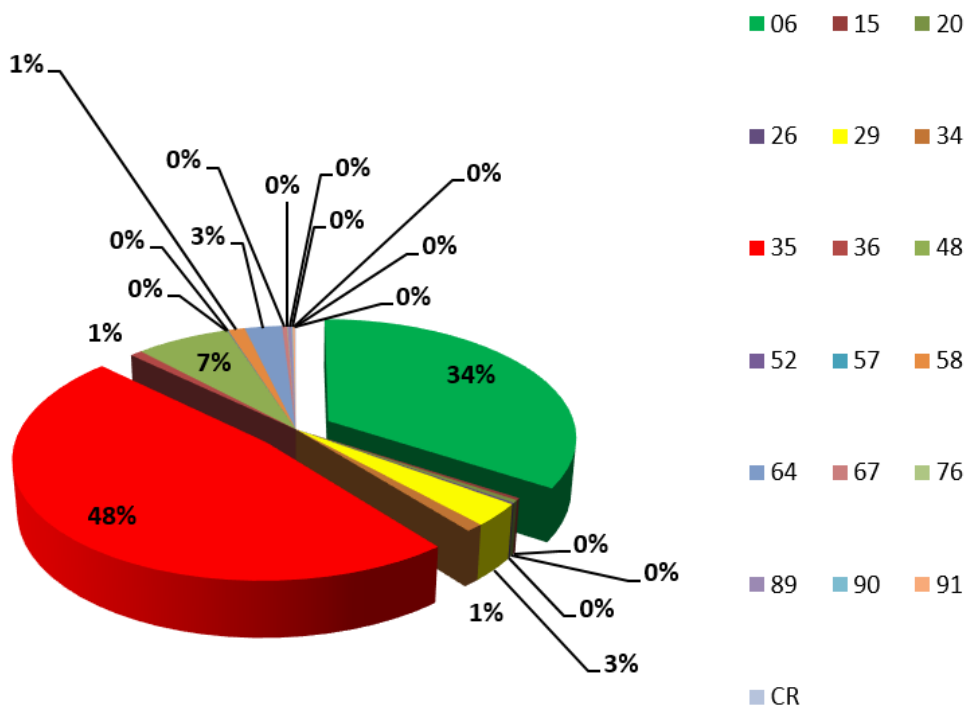
Some DM files have been updated to format version 3.1 taking into account a new decoder (matlab) developed at Coriolis. This work has been done for Provor and Apex, few files need to be manually updated.

Regular DM files submission is performed each year but an effort has been done since the year 2018 and following in 2019 to increase the DM files number.



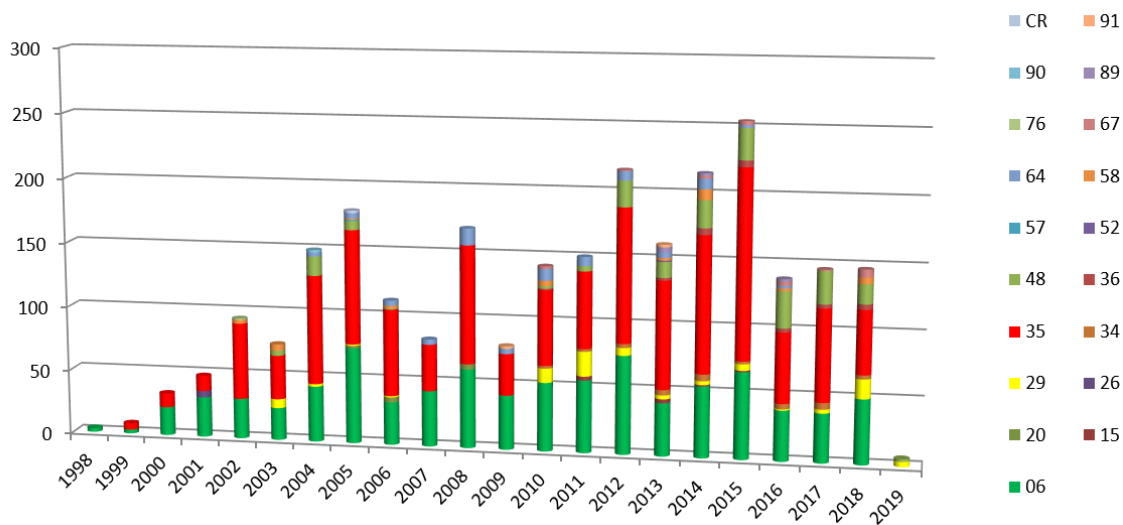
Evolution of the DM profiles' submission versus dates

Floats by country



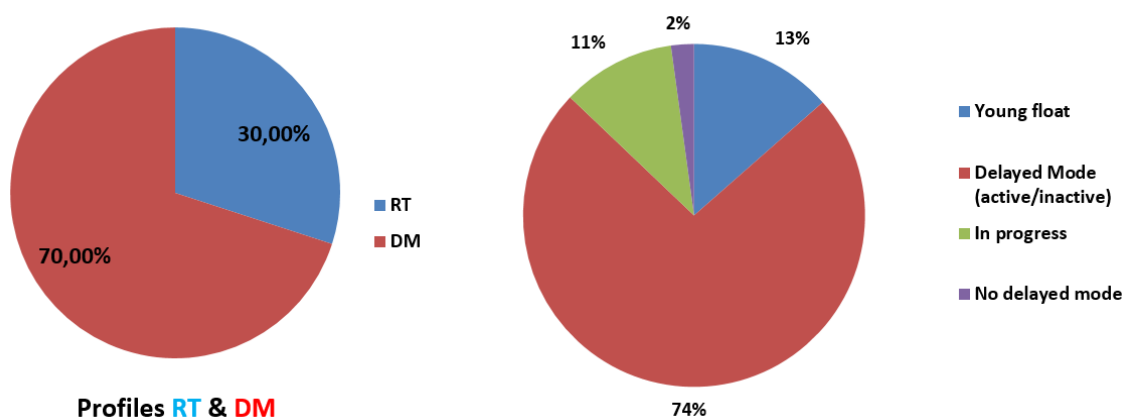
Percentage of floats by country in the Coriolis DAC.

Codes for the countries: 06 : Germany - 15 : Bulgaria - 20 : Chili - 26 : Denmark - 29 : Spain - 34 : Finland - 35 : France - 36 : Greece - 48 : Italy - 52 : Lebanon - 57 : Mexico - 58 : Norway - 64 : Netherlands - 67 : Poland - 76 : China - 89 : Turkey - 90 : Russia - 91 : - South Africa - CR : Costa Rica



Number of floats by country and by launch's year in the Coriolis DAC

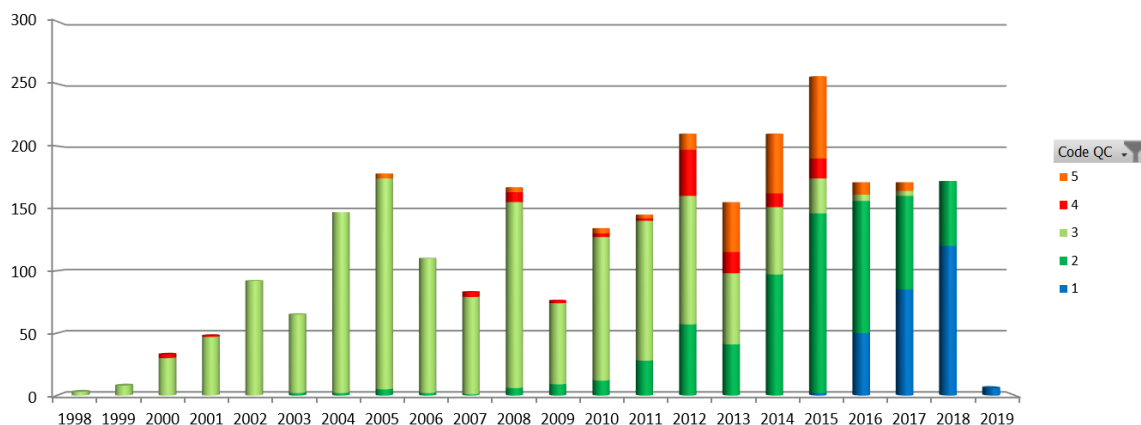
During the last year (from October 2018 to October 2019), 29180 new delayed mode profiles were produced and validated by PIs. A total of 222773 delayed mode profiles were produced and validated since 2005.



Status of the floats processed by Coriolis DAC.

Left: in terms of profile percent and right: in terms of float percent (DM : delayed mode – RT : real time).

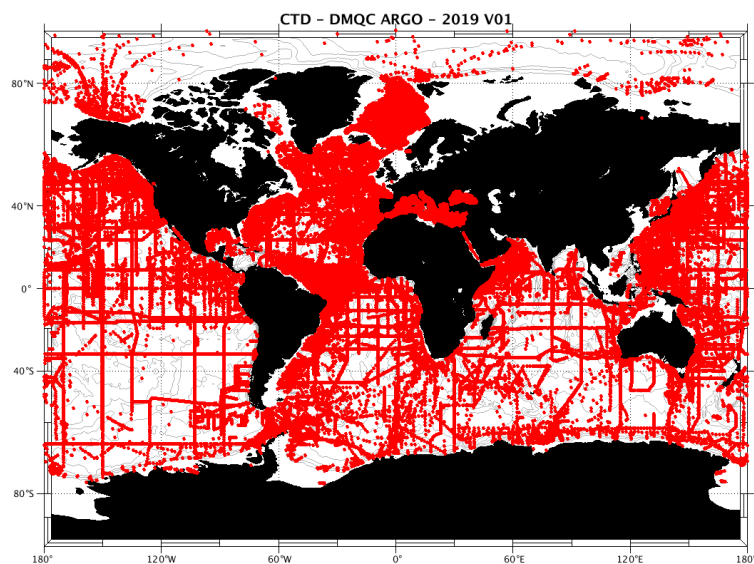
The status of the quality control done on the Coriolis floats is presented in the following plot. For the two last years (2018-2019), most of the floats are still too young (code 1) to be performed in delayed mode. For the years 2012-2013-2014, we are still working on the DMQC of some floats. The codes 2 and 3 show the delayed mode profiles for respectively active and dead floats.



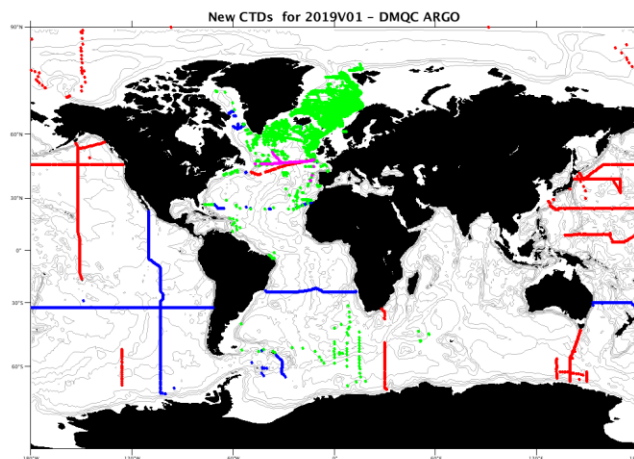
Status of the quality control done on profiles sorted by launch's year, code 1: young float, code 2: active float, DM done, code 3 : dead float, DM done; code 4 : DM in progress, code 5 : waiting for DM, code 6 : problems with float.

2.1 Reference database

At the end of 2018, an updated version 2018V02 has been provided with some updates on a few boxes and including 12 cruises from the program GO-SHIP. This year 2019, a new version 2019V01 including CCHDO, OCL and ICES updates, CTD from PI, correction from feedbacks will be available on the ftp site in the middle of October.



This new version includes 12 new cruises from the GO-SHIP program (downloaded from the CCHDO website), updates from OCL, ICES and MSM cruise provided by a scientist. A work has also been done for the boxes in the North Sea, with Ingrid Angel from BSH. Expertise on data has been realized to improve the quality and new data has been added (from UDASH and ICES).



GO-SHIP – OCL- ICES-MSM

This version is divided in smaller tar balls, one by wmo box area (1-3-5-7): for instance, CTD_for_DMQC_2018V01_1.tar.gz for all boxes starting with wmo 1, then we will have 4 tar files.

3 GDAC Functions

(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)

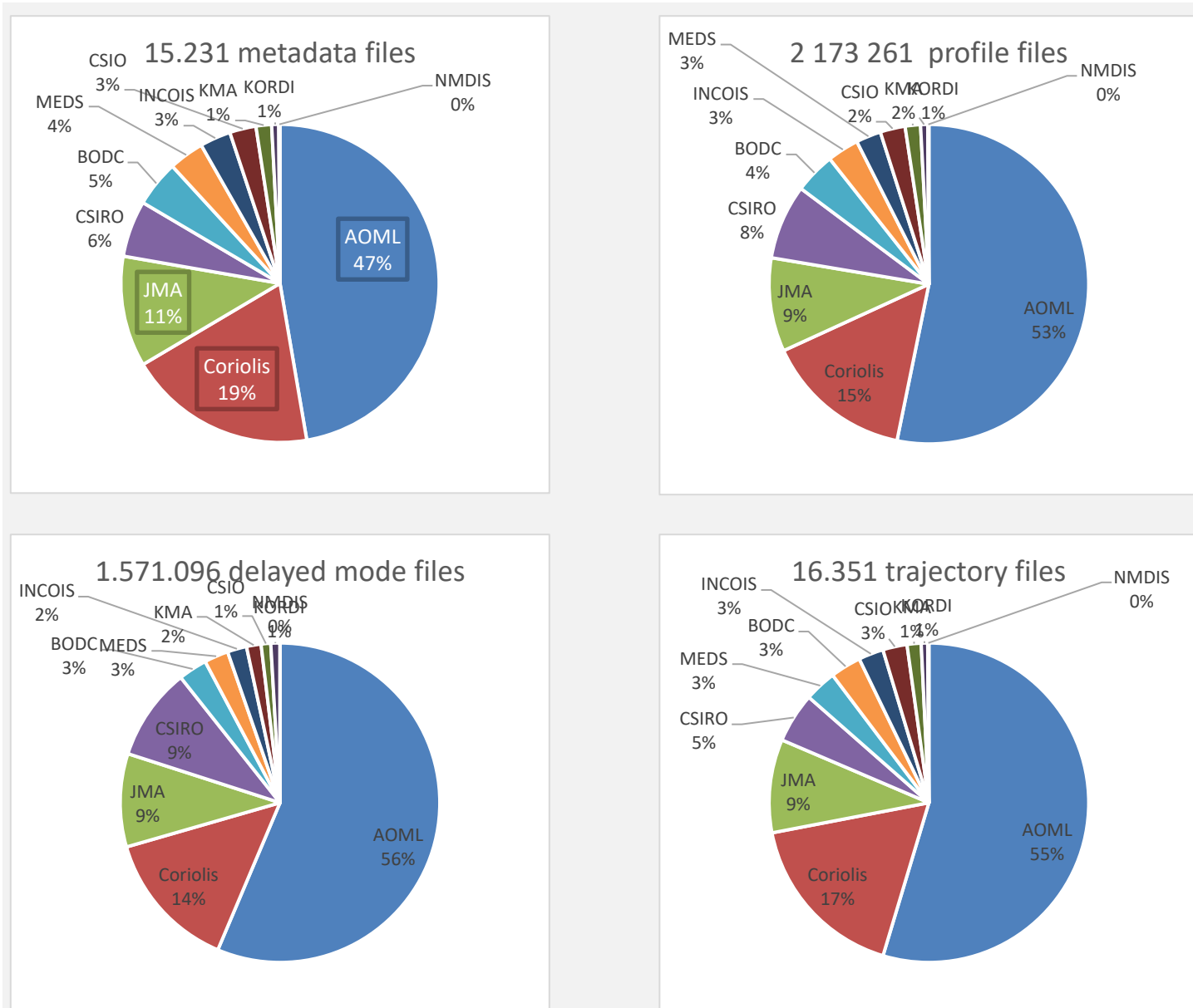
- National centres reporting to you
- Operations of the ftp server
- Operations of the www server
- Data synchronization
- Statistics of Argo data usage : Ftp and WWW access, characterization of users (countries, field of interest : operational models, scientific applications) ...

3.1 National centres reporting to you

Currently, 11 national DACs submit regularly data to Coriolis GDAC. On September 2019, the following files were available from the GDAC FTP site.

3.1.1 GDAC files distribution

DAC	metadata files 2019	Increase	profile files 2019	increase2	delayed mode profile files 2019	increase3	trajectory files 2019	increase4
AOML	7 205	3%	1 156 291	6%	885 520	8%	8 934	4%
BODC	715	5%	89 781	12%	45 686	36%	509	0%
Coriolis	2 922	6%	325 133	10%	222 641	12%	2 835	7%
CSIO	408	1%	54 914	9%	15 260	49%	402	1%
CSIRO	873	4%	164 482	7%	147 208	10%	826	3%
INCOIS	478	6%	69 633	7%	30 651	8%	413	0%
JMA	1 715	7%	206 144	4%	148 198	20%	1 545	2%
KMA	241	0%	33 685	6%	23 094	0%	232	4%
KORDI	109	-1%	15 736	-1%	14 505		107	0%
MEDS	546	7%	55 002	5%	38 333	2%	529	8%
NMDIS	19	0%	2 460	0%	0		19	0%
Total	15 231	4%	2 173 261	7%	1 571 096	11%	16 351	4%



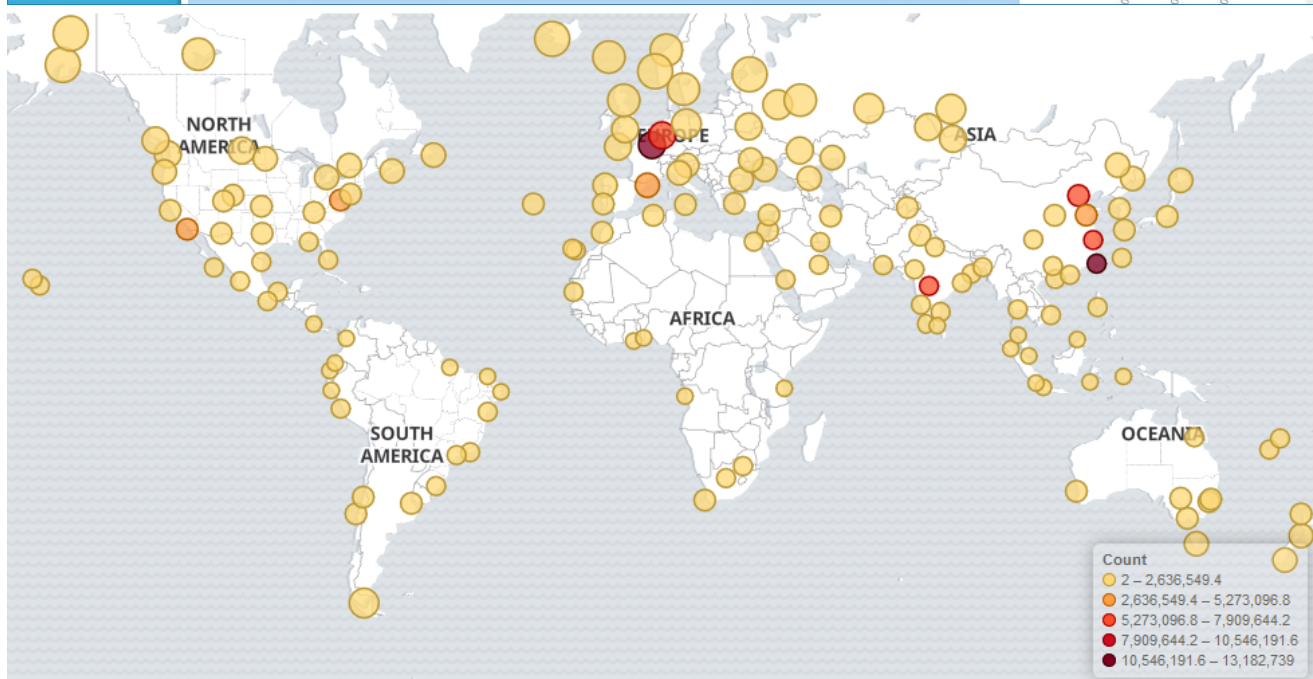
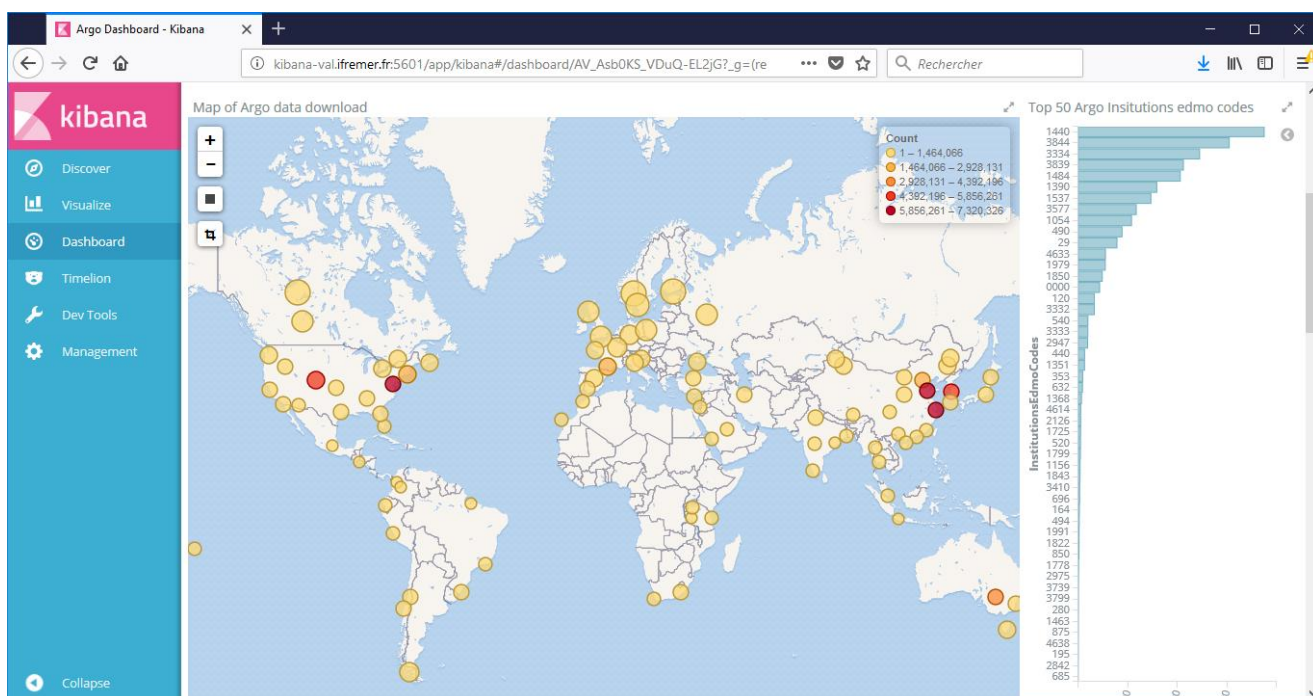
Number of files available on GDAC, November 2018

3.1.2 Argo Semaphore dashboard: give credit to data providers

Within EU AtlantOS project, Ifremer is setting up a dashboard (Semaphore) to monitor data distribution and give credit to data providers such as Argo floats.

FTP downloads log files are ingested in an Elasticsearch index. A link between downloaded files, download originators, floats included in the downloaded files and institution owners of the floats is performed. These links are displayed in a Kibana dashboard.

This dashboard will offer the possibility to give credit to Floats owner institutions such as how many data from one particular institution was downloaded, by whose data users.



Geographical distribution of GDAC ftp downloads in 2018 - 2019

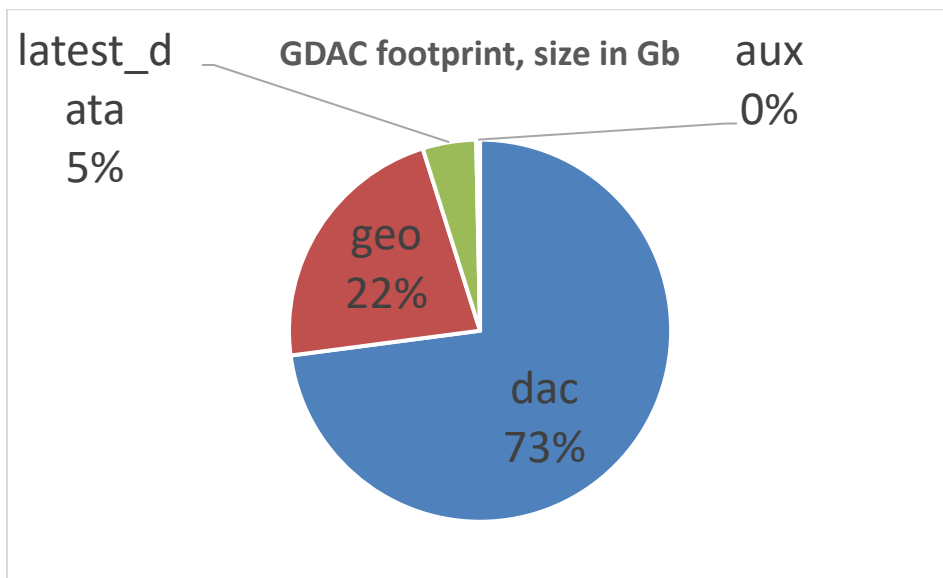
The majority of users (red dots) are located in USA, China, Australia and of course Europe. The right side histogram sorts the floats institution code (1440: PMEL, 3844: WHOI, 3334: INCOIS, 3839: UWA, 1484: CSIRO, ...).

Argo data management

3.1.3 GDAC files size

- The total number of NetCDF files on the GDAC/dac directory was 2 420 372
- The size of GDAC/dac directory was 275Gb (+12%)
- The size of the GDAC directory was 593Gb (+7%)

branch	2019 Gb	yearly increase
dac	338	28%
geo	103	17%
latest_data	21	33%
aux	2	53%
gdac total	593	42%



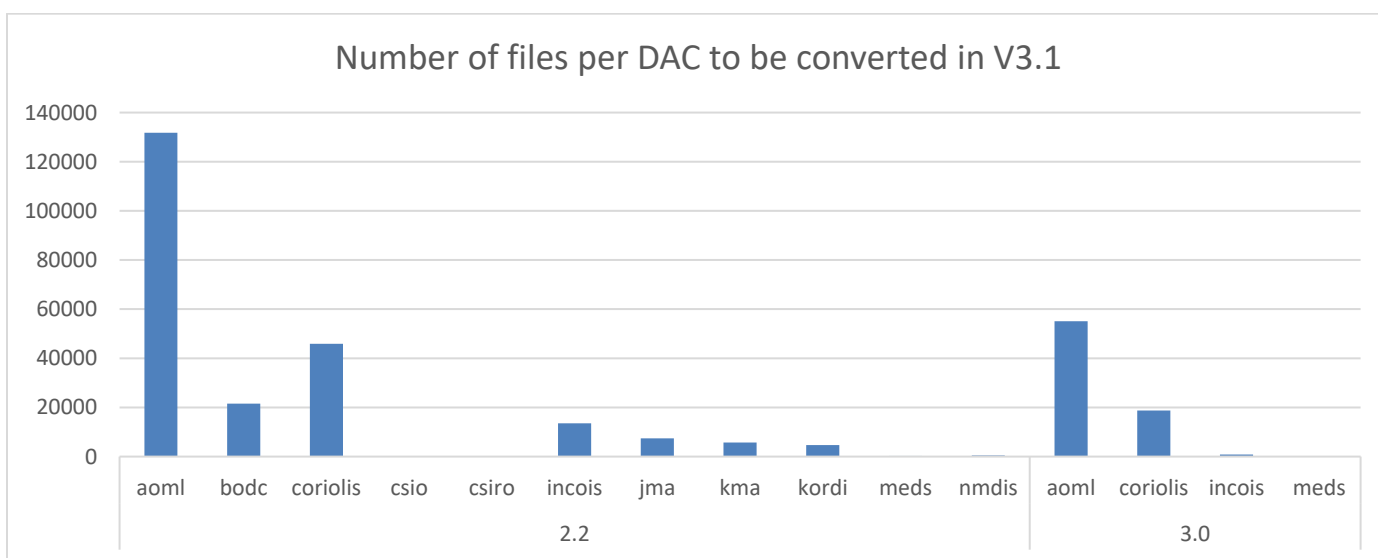
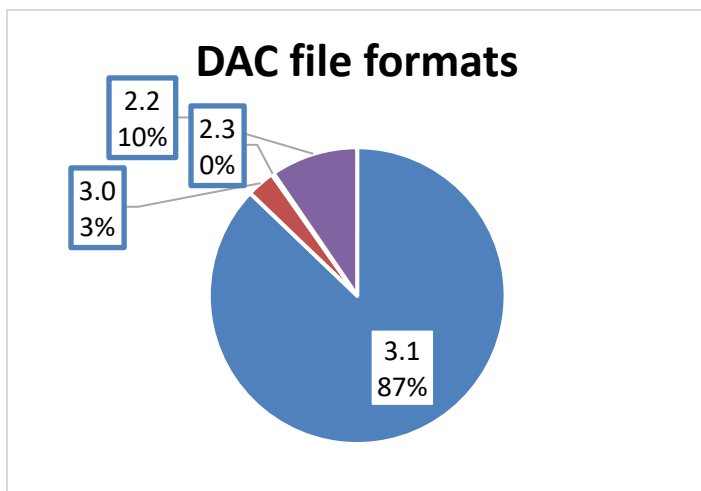
3.1.4 Argo NetCDF transition to format V3.1

This chapter was not yet updated in 2019. The results showed below are the now obsolete figures from 2018.

The transition from Argo format 2.* and 3.0 toward Argo NetCDF format 3.1 is underway. In 2018, the number of files in format version 3.1 is heading toward 90%.

format version	nb files	percentage
3.1	2 113 833	87%

3.0	74 670	3%
2.3	5 422	0%
2.2	231 497	10%
2.1	12	0%
Total	2 425 434	100%



<i>File format</i>	<i>number of files</i>
2.2	231497
<i>aoml</i>	<i>131785</i>
<i>bodc</i>	<i>21554</i>
<i>coriolis</i>	<i>45916</i>
<i>csio</i>	<i>63</i>
<i>csiro</i>	<i>10</i>

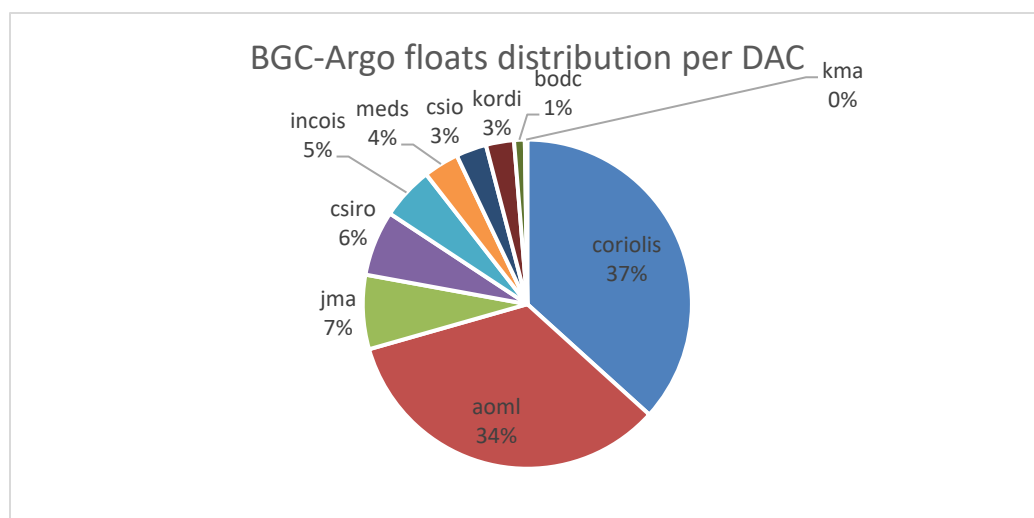
<i>incois</i>	13562
<i>jma</i>	7452
<i>kma</i>	5747
<i>kordi</i>	4674
<i>meds</i>	286
<i>nmdis</i>	448
3.0	74670
<i>aoml</i>	55061
<i>coriolis</i>	18741
<i>incois</i>	864
<i>meds</i>	4
Total général	306167

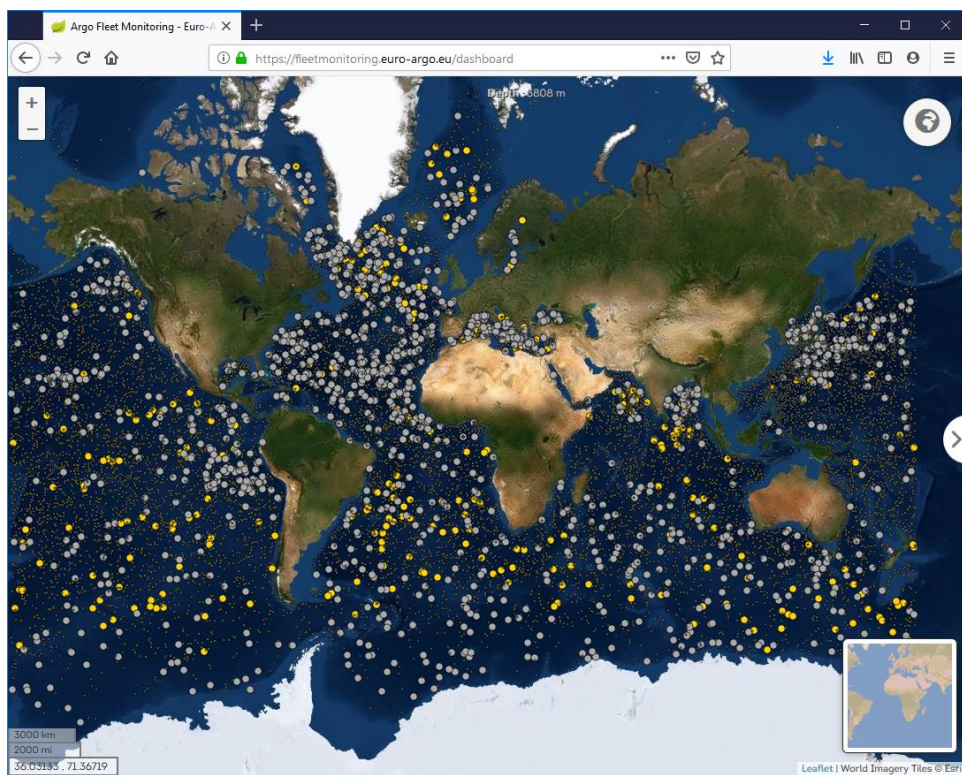
The files in format version V3.1 are much more homogeneous than their previous versions. The controls applied by the format checker on V3.1 is much more exhaustive. The controlled vocabulary listed in the 27 reference tables is used for V3.1 format checks. A non-valid content is automatically rejected. Only valid V3.1 content appears on GDAC.

3.1.5 BGC-Argo floats

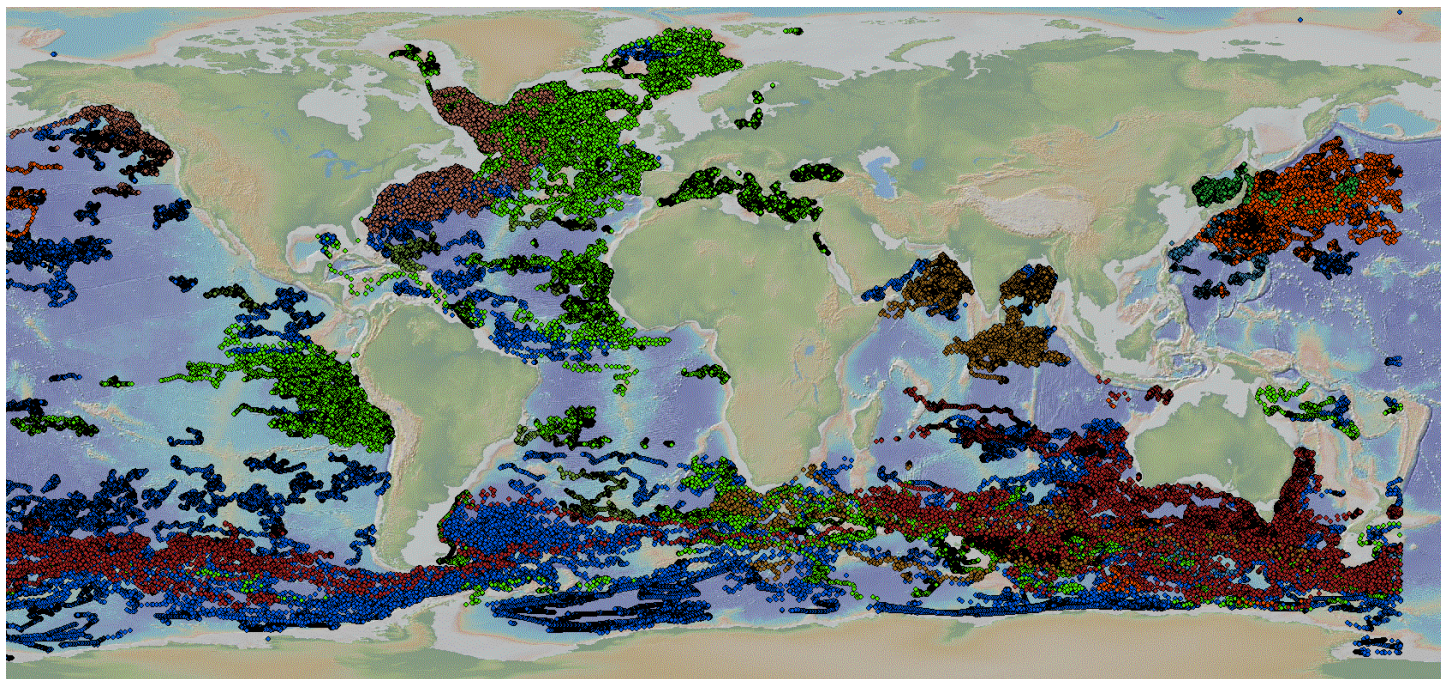
In October 2019, 189.142 BGC-Argo profiles from 1234 floats were available on Argo GDAC. This is a strong increase compared to 2018: +15% more float and +14% more profiles.

DAC	nb bgc floats	nb bgc files
Coriolis	453	63 634
Aoml	418	59 762
Jma	90	15 629
Csiro	79	21 498
Incois	64	8 667
Meds	43	4 263
Csio	37	7 562
Kordi	34	3 555
Bodc	13	4 110
Kma	3	462
Total	1234	189 142

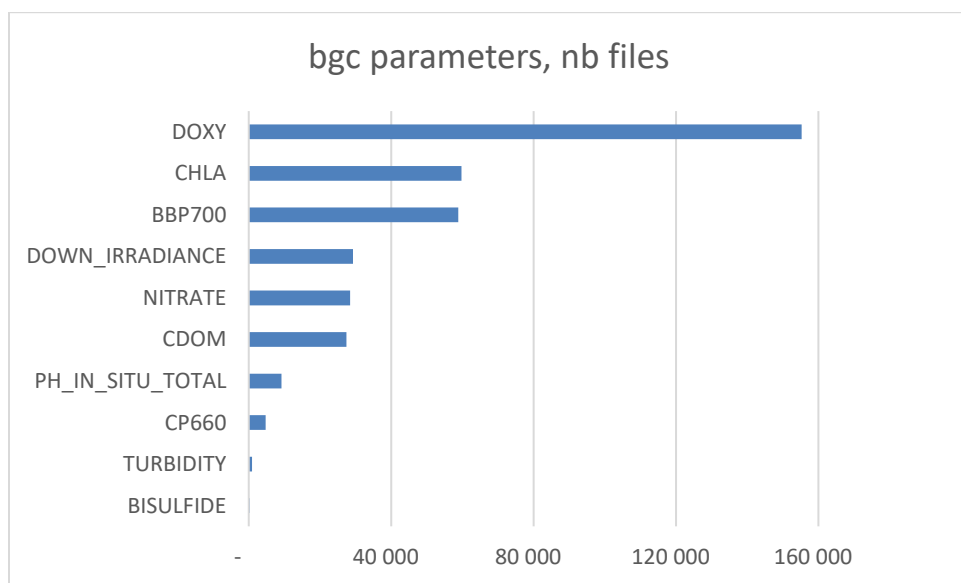




Map of 209 BGC-Argo floats (active: yellow, other: grey) from <https://fleetmonitoring.euro-argo.eu/dashboard>



BGC-Argo profiles, colored by DACs



Main BGC-Argo physical parameters, number of profiles

parameter	nb files
BISULFIDE	255
TURBIDITY	904
CP660	4 722
PH_IN_SITU_TOTAL	9 209
CDOM	27 455
NITRATE	28 475
DOWN_IRRADIANCE	29 259
BBP700	58 852
CHLA	59 756
DOXY	155 309

3.2 Operations of the ftp and web server

For each individual DAC, every 30 minutes, meta-data, profile, trajectory and technical data files are automatically collected from the national DACs. The 11 DACs are processed in parallel (one process launched every 3 minutes).

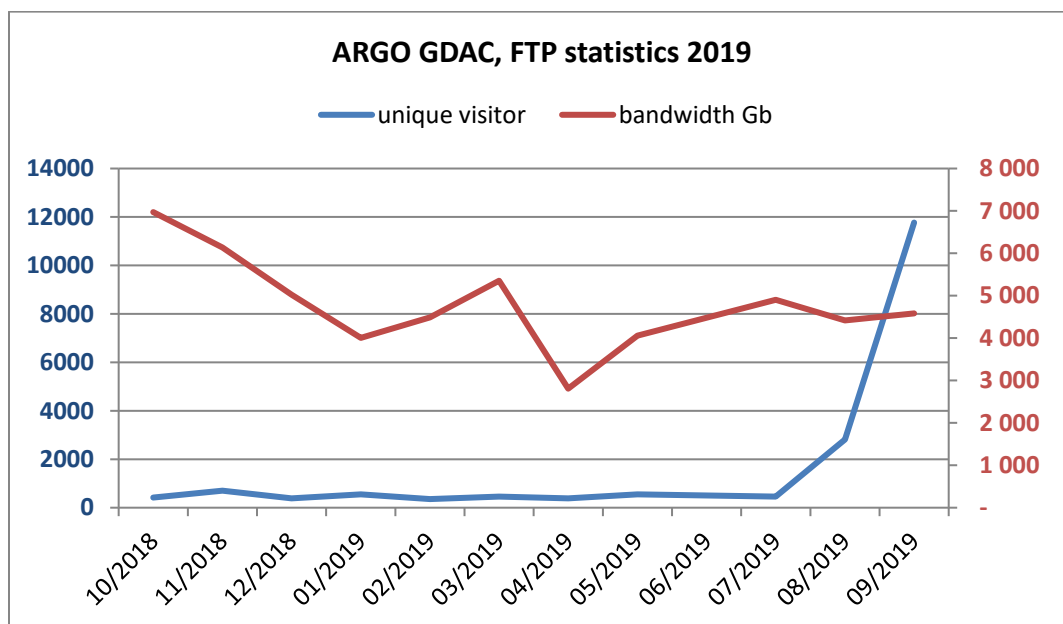
Index files of metadata, profiles, trajectories, technical and auxiliary data are hourly updated.

GDAC ftp address: <ftp://ftp.ifremer.fr/ifremer/argo>

Statistics on the Argo GDAC FTP server: <ftp://ftp.ifremer.fr/ifremer/argo>

There is a monthly average of 561 unique visitors, performing 4302 sessions and downloading 5.9 terabytes of data files.

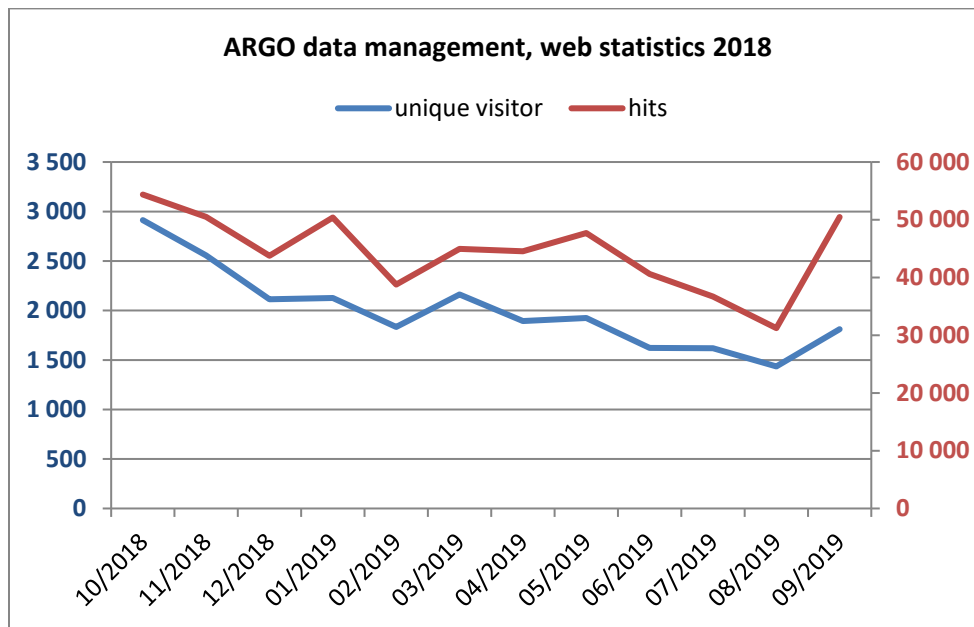
The table below shows an unusual increase of visitors in August and September on GDAC FTP; we do not have a specific explanation.



ARGO GDAC FTP statistics				
month	unique visitor	number of visits	hits	bandwidth Gb
10/2018	417	4 202	10 758 854	6 972
11/2018	701	5 727	8 648 964	6 137
12/2018	385	4 519	8 576 991	5 023
01/2019	548	4 931	5 683 220	4 007
02/2019	356	4 717	4 234 694	4 490
03/2019	459	5 946	5 490 499	5 351
04/2019	385	4 851	4 219 564	2 808
05/2019	551	7 111	6 978 746	4 059
06/2019	499	5 316	6 847 654	5 316
07/2019	460	5 978	5 055 490	4 903
08/2019	2 816	8 291	4 889 725	4 417
09/2019	11 769	19 205	5 212 730	4 584
Average	1 612	6 733	6 383 094	4 839

Statistics on the Argo data management web site: <http://www.argodatamgt.org>

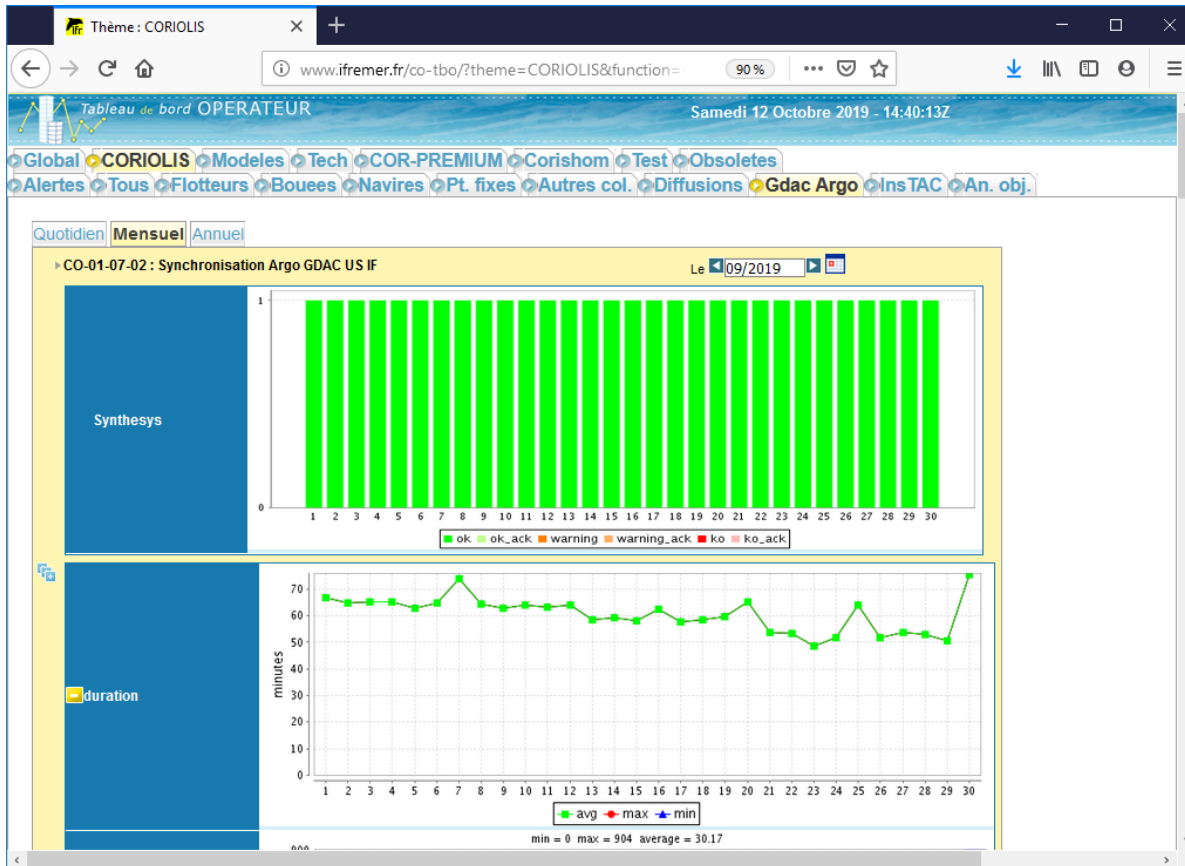
There is a monthly average of 2000 unique visitors, performing 2900 visits and 44500 hits. The graphics shows a slightly decreasing number of unique visitors.



ARGO GDAC web statistics					
month	unique visitor	visits	pages	hits	bandwidth Go
10/2018	2 913	4 303	7 947	54 367	1,5
11/2018	2 557	3 684	7 370	50 493	1,38
12/2018	2 114	3 064	6 075	43 756	1,08
01/2019	2 126	3 062	6 334	50 387	1,28
02/2019	1 833	2 634	5 514	38 784	1
03/2019	2 162	3 136	6 063	44 966	1,18
04/2019	1 894	2 764	5 748	44 551	0,9
05/2019	1 925	2 809	5 719	47 697	1,53
06/2019	1 622	2 356	4 971	40 602	1,11
07/2019	1 619	2 326	4 524	36 706	1,45
08/2019	1 435	2 060	4 043	31 235	0,9
09/2019	1 811	2 814	6 374	50 463	1,55
Average	2 001	2 918	5 890	44 501	1,24

3.3 GDAC files synchronization

The synchronization with US-GODAE server is performed once a day at 03:55Z



Synchronization dashboard in September 2019: the daily sync. time takes on average 1 hour, 100% successful.

You may notice on the dashboard that the synchronization process reported 5 errors in November (red bars):

- “Can't create the ftp connection to usgodae.org”
There was an ftp connection problem between Coriolis and US GDACs

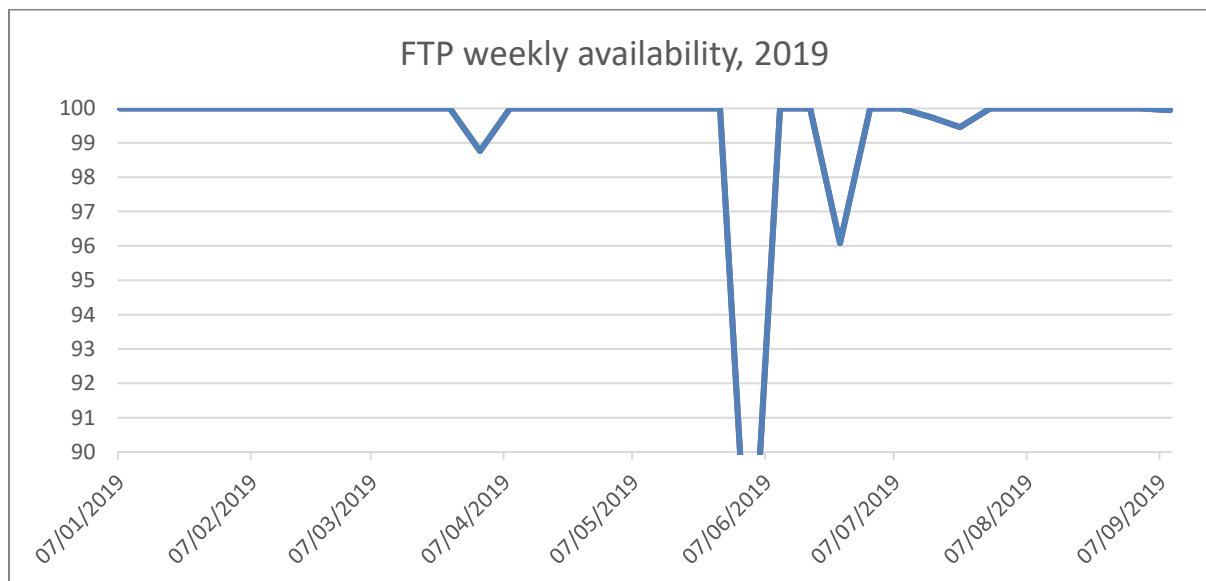
3.4 FTP server monitoring

The Argo GDAC ftp server is actively monitored by a Nagios agent (<http://en.wikipedia.org/wiki/Nagios>).

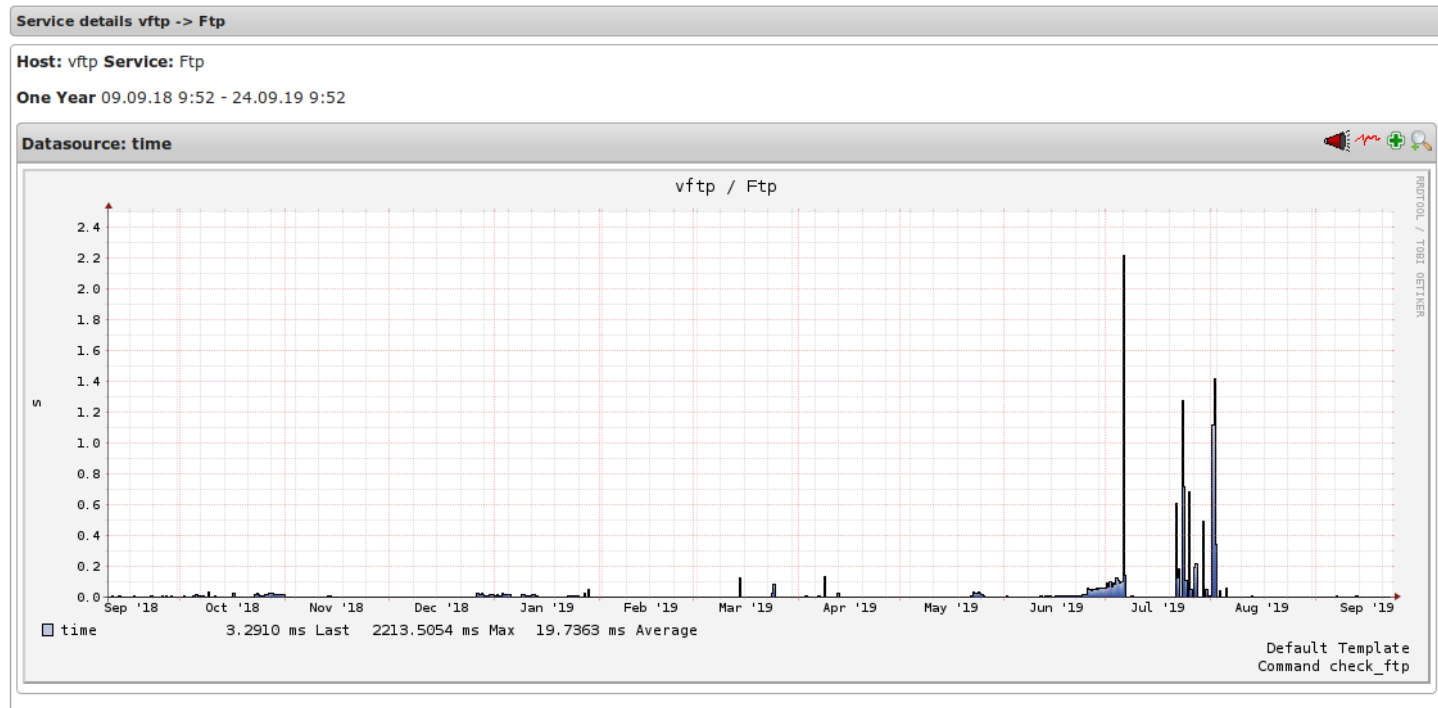
Every 5 minutes, an ftp download test and an Internet Google query are performed. The success/failure of the test and the response time are recorded. The FTP server is a virtual server on a linux cluster.

On the last 9 months, the FTP server was operational on 99.540% of time, non-operational during 1 day and 2 hours (0.421%). This is a very poor performance compared to last year (only 14 minutes non-operational in 2018). The main explanation is electricity maintenance work, which will hopefully improve the future FTP availability. The graphics below shows that the major FTP outages occurred on June 7th and then in July 6th 2019.

FTP server monitoring 01/01/2019 - 24/09/2019			
Status	percentage	duration	comment
OK	99,540%	256d 3h 7m 20s	operational
Warning	0,039%	0d 2h 10m 10s	poor performance
Unknown	0,000%	0d 0h 0m 0s	
Critical	0,421%	1d 2h 56m 22s	non operational

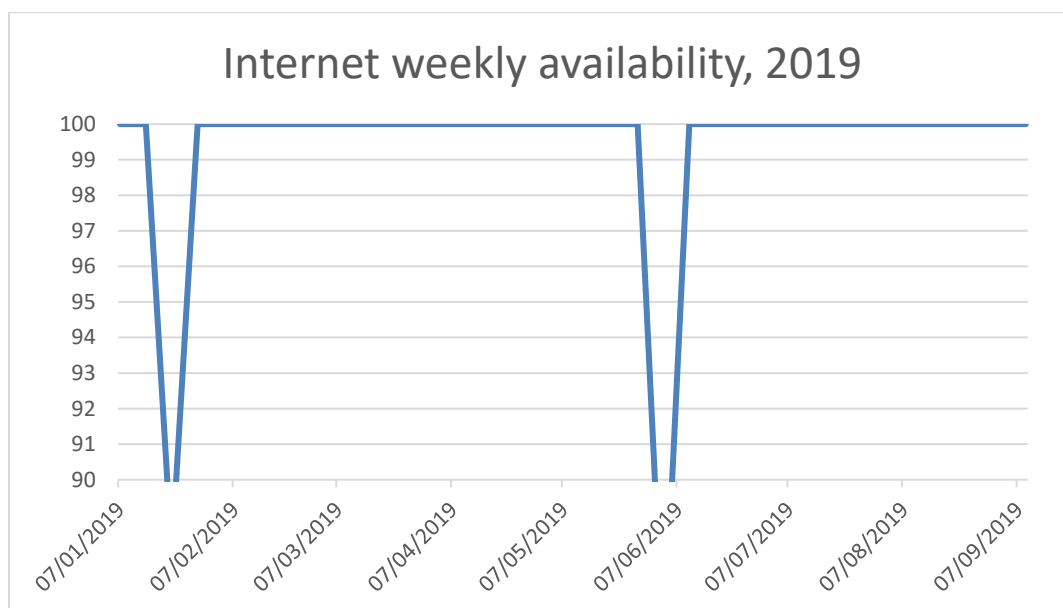


Nagios ftp monitoring: between January and September 2019



FTP server response time monitoring, poor performances end of June and in July

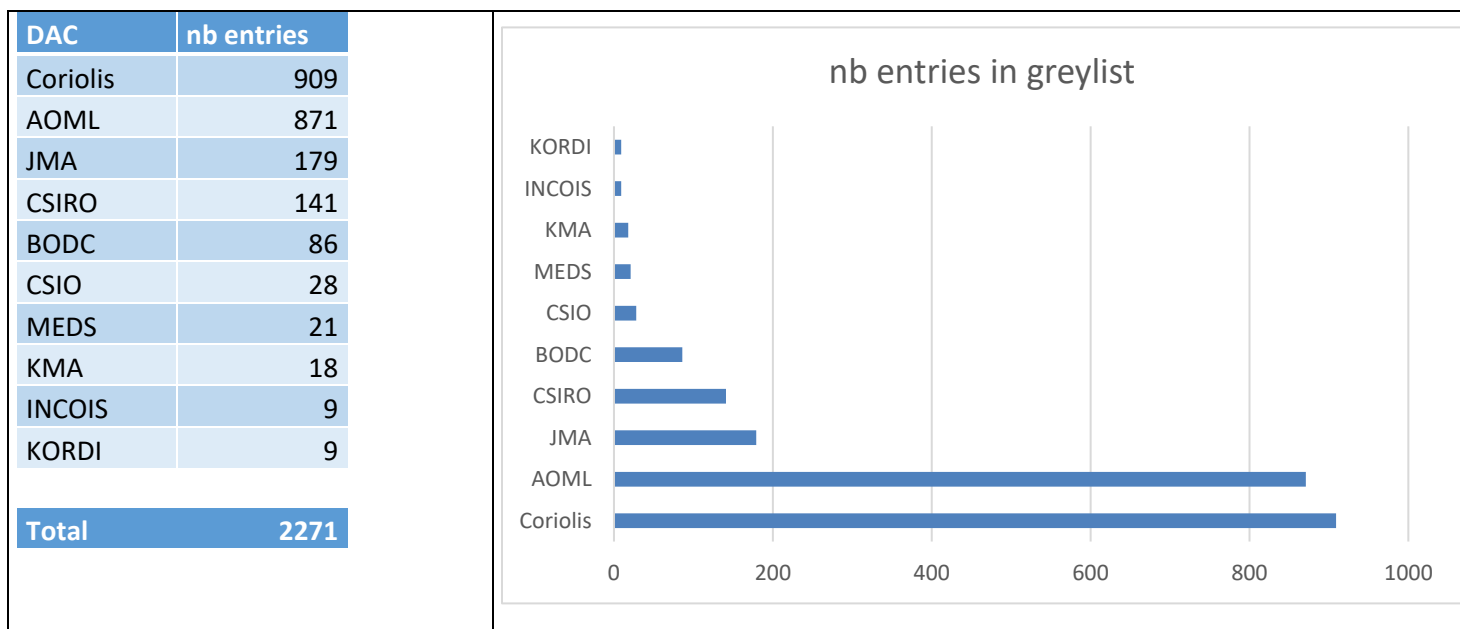
Internet access monitoring 01/01/2019 - 16/09/2019			
Status	percentage	duration	comment
OK	99,816%	265d 20h 33s	operational
Warning	0,000%	0d 0h 0m 0s	poor performance
Unknown	0,000%	0d 0h 0m 0s	
Critical	0,184%	0d 11h 46m 12s	non operational



Nagios Internet monitoring: between January and September 2019, poor performances in January and June.

3.5 Grey list

According to the project requirements Coriolis GDAC hosts a grey list of the floats which are automatically flagged before any automatic or visual quality control. **The greylis has 2271 entries** (September 2019), compared to 1873 entries one year ago. **The 21% increase can partly be attributed to BGC sensors in greylis.**



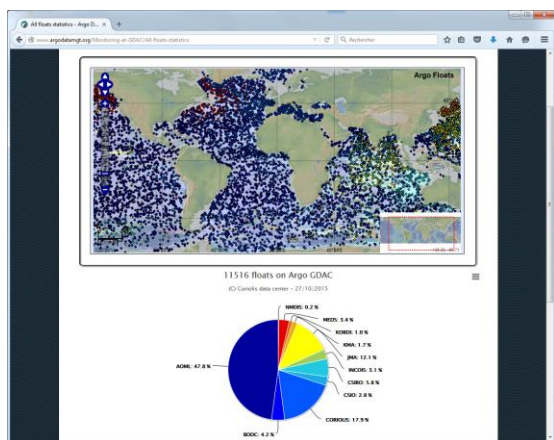
Distribution of greylis entries per DAC and per parameter

Coriolis reports many BGC greylis entries.

parameter	nb entries
PSAL	1152
TEMP	234
CDOM	211
PRES	209
BBP700	170
CHLA	122
DOXY	61
CP660	43
DOWN_IRRADIANCE380	16
DOWN_IRRADIANCE412	16
DOWN_IRRADIANCE490	16
DOWNWELLING_PAR	16
NITRATE	4
BBP532	1

3.6 Statistics on GDAC content

The following graphics display the distribution of data available from GDAC, per float or DACs. These statistics are daily updated on: <http://www.argodatamgt.org/Monitoring-at-GDAC>



3.7 Mirroring data from GDAC: rsync service

In July 2014, we installed a dedicated rsync server called `vdmzrs.ifremer.fr` described on:

- <http://www.argodatamgt.org/Access-to-data/Argo-GDAC-synchronization-service>

This server provides a synchronization service between the "dac" directory of the GDAC with a user mirror. From the user side, the rsync service:

- Downloads the new files

- Downloads the updated files
- Removes the files that have been removed from the GDAC
- Compresses/uncompresses the files during the transfer
- Preserves the files creation/update dates
- Lists all the files that have been transferred (easy to use for a user side post-processing)

Examples

Synchronization of a particular float

- `rsync -avzh --delete vdmzrs.ifremer.fr::argo/coriolis/69001 /home/mydirectory/...`

Synchronization of the whole dac directory of Argo GDAC

- `rsync -avzh --delete vdmzrs.ifremer.fr::argo/ /home/mydirectory/...`

3.8 Argo DOI, Digital Object Identifier on monthly snapshots

A digital object identifier (DOI) is a unique identifier for an electronic document or a dataset. Argo data-management assigns DOIs to its documents and datasets for two main objectives:

- Citation: in a publication the DOI is efficiently tracked by bibliographic surveys
- Traceability: the DOI is a direct and permanent link to the document or data set used in a publication
- More on: <http://www.argodatamgt.org/Access-to-data/Argo-DOI-Digital-Object-Identifier>

Since July 2019, the DOI monthly snapshot of Argo data is a compressed archive (.gz) that contains distinct core-Argo tar files and BGC-Argo tar files. A core-Argo user can now ignore the voluminous BGC-Argo files.

Argo documents DOIs

- Argo User's manual: <http://dx.doi.org/10.13155/29825>

Argo GDAC DOI

- Argo floats data and metadata from Global Data Assembly Centre (Argo GDAC) <http://doi.org/10.17882/42182>

Argo GDAC monthly snapshots DOIs

- Snapshot of 2018 November 8th <http://doi.org/10.17882/42182#59903>
- Snapshot of 2014 October 8th <http://doi.org/10.17882/42182#42280>
- Snapshot of 2012 December 1st <http://doi.org/10.17882/42182#42250>