



Coriolis DAC and GDAC activity

BGC-Argo

ADMT20 14th October 2019



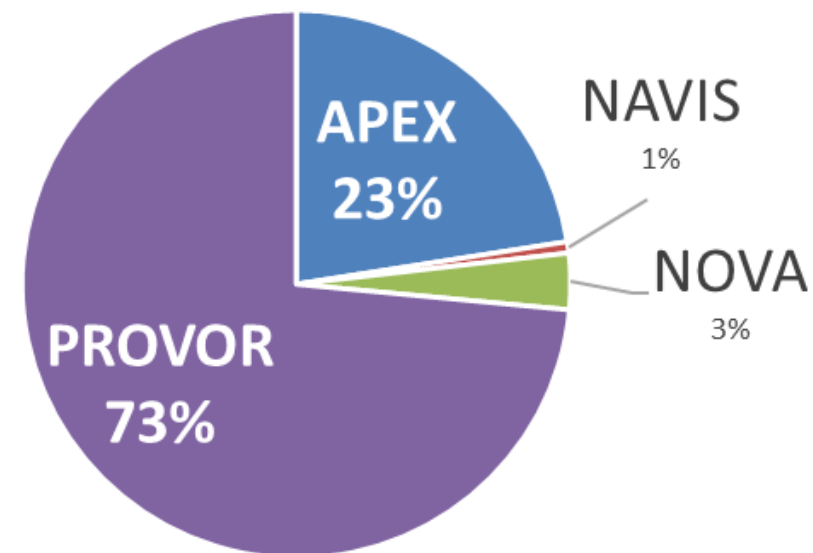
Coriolis BGC-Argo data management

- The Coriolis data processing chain for Argo and BGC-Argo data and metadata is continuously improved. It is freely available on *Coriolis Argo floats data processing chain* <http://doi.org/10.17882/45589>
 - Matlab code, handles 160 (*including 60 bgc*) float format versions for 5 families (apex, navis, nova, provor; nemo coming soon)
 - If needed, a compiled version can be provided (java binary, no matlab license)
- Data and metadata from Coriolis DAC floats are distributed on Argo GDAC. They feature version 3.1 core and bgc-profiles, core and bgc-trajectories, metadata and technical data.

- In September 2019, 63 634 BGC-Argo cycle files from 453 floats were available on Coriolis DAC

BGC-Argo floats processed by Coriolis DAC

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

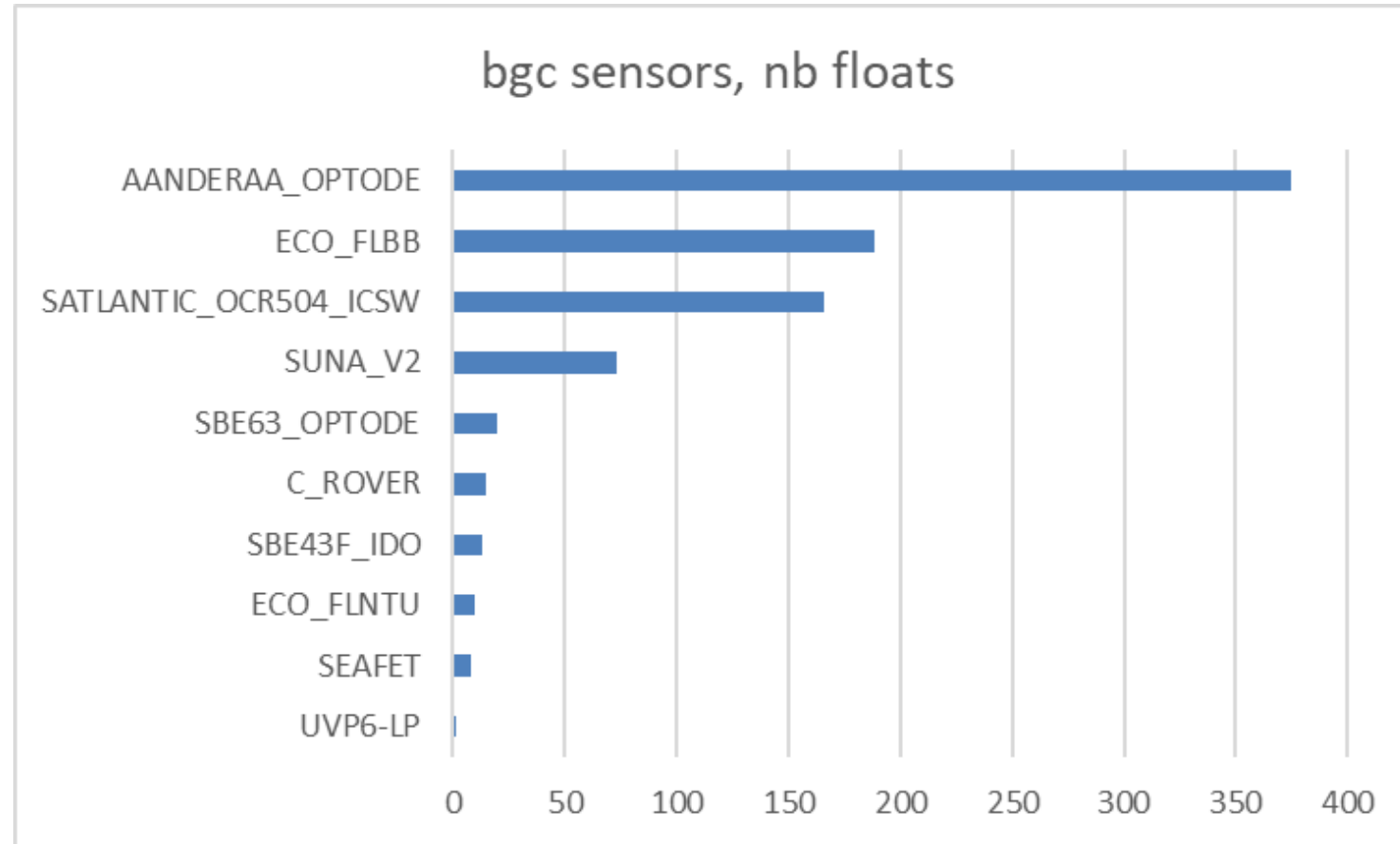




Coriolis BGC-floats

- 10 BGC sensors installed on Coriolis DAC floats, reporting 12 main parameters

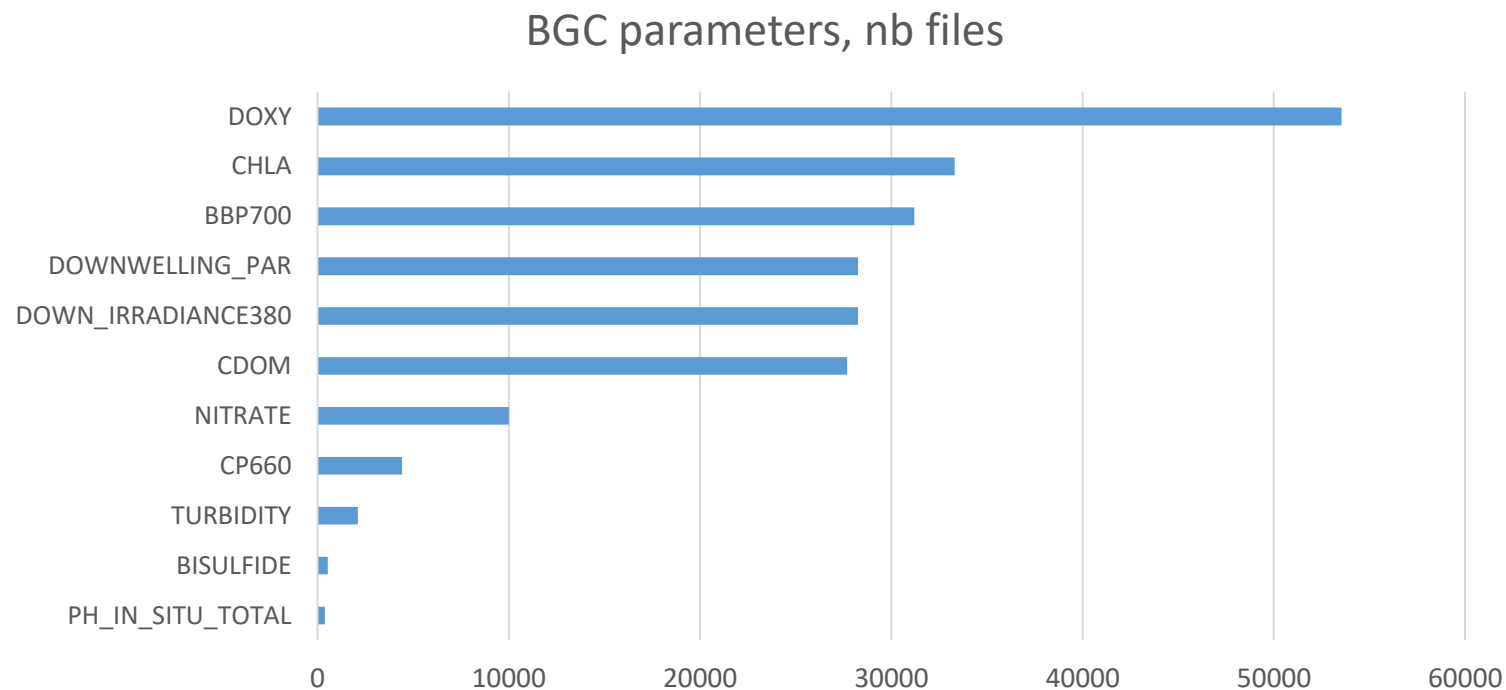
Coriolis BGC-Argo floats sensor	nb floats	nb profiles
AANDERAA_OPTODE	375	50798
ECO_FLBB	188	97530
SATLANTIC_OCR504_ICSW	166	120504
SUNA_V2	73	10933
SBE63_OPTODE	20	1885
C_ROVER	15	4449
SBE43F_IDO	13	1596
ECO_FLNTU	10	5366
SEAFET	8	409
UVP6-LP	1	30





- 10 BGC sensors installed on Coriolis floats, reporting 12 main parameters

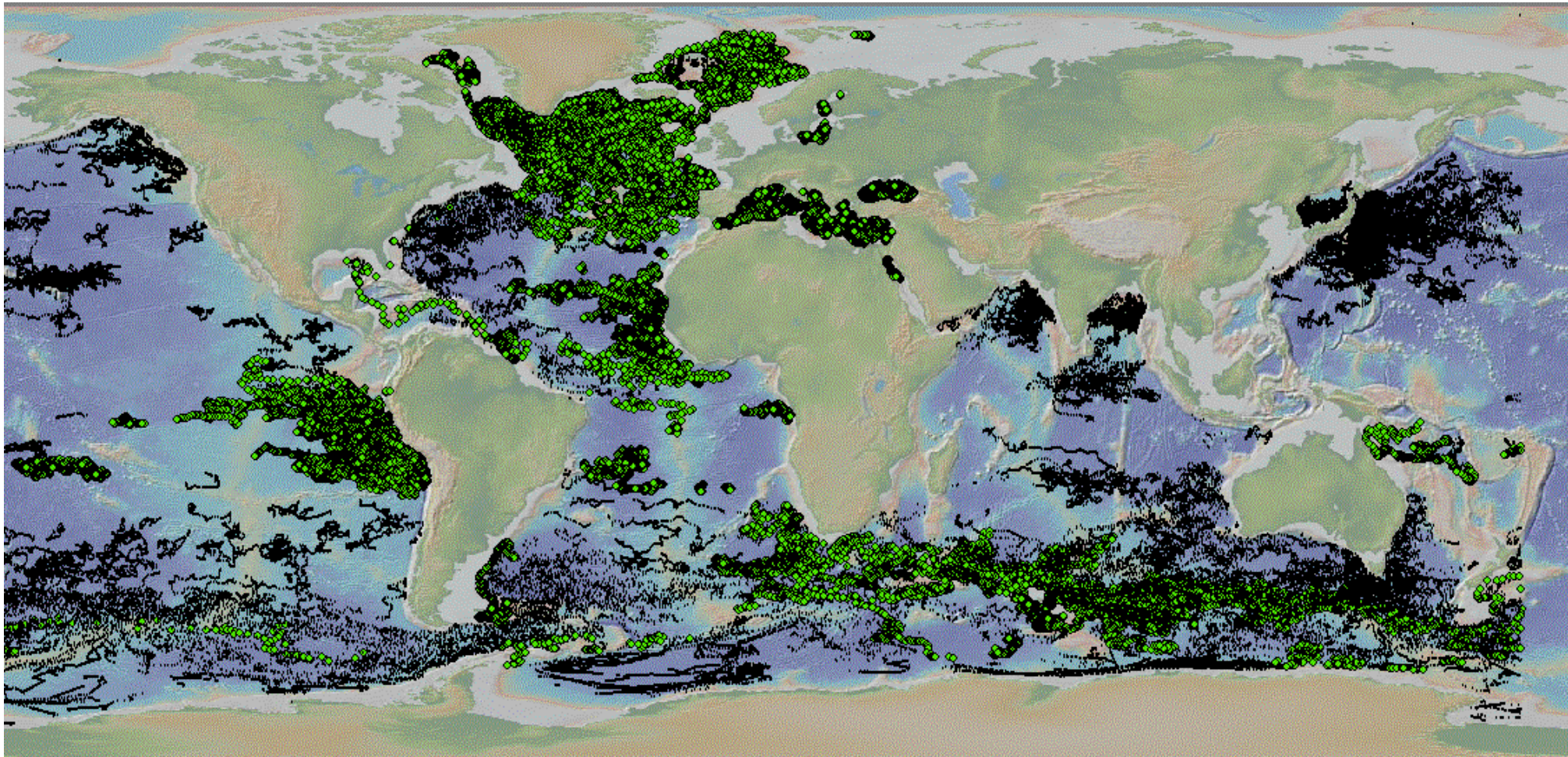
PARAMETER_CODE	NB_FILE
DOXY	53 538
CHLA	33 309
BBP700	31 200
DOWN_IRRADIANCE380	28 264
DOWNWELLING_PAR	28 264
CDOM	27 697
NITRATE	10 003
CP660	4 423
TURBIDITY	2 109
BISULFIDE	543
PH_IN_SITU_TOTAL	389





Map of Coriolis BGC floats

- Green dots : 63 634 BGC-Argo cycle files from 453 floats
- Grey dots: the others DACs bio-Argo floats





Coriolis BGC-floats

- Chlorophyll-A data reprocessing
 - An anomaly on the CHLA spike test was detected in February, CHLA profiles were reprocessed
- Nitrate data reprocessing
 - In July 2019, the 35 000 nitrate files were reprocessed
- Radiometry reprocessing
 - In September 2019, the radiometry global range QC was applied
- Oxygen real time data quality issue
 - General inspection of Coriolis floats, many sensors placed in greylist waiting for delayed mode processing and real-time adjustment (April-May 2019)
- Oxygen real time adjustment, since September 2019
 - When oxygen delayed mode files are delivered, for each of the floats, the most recent offset and slope on PPOX_DOXY are reported as a real time adjustment.
- Apex APF11 with ECO3 and OCR managed since June 2019
- Provor CTS4 pH sensor managed since June 2019
- Provor UVP float managed since September 2019



Coriolis BGC-Argo floats, transmission systems

- Iridium rudics bi-directional communication
 - RUDICS
 - SBD
- Argos



Coriolis BGC-Argo floats, RTQC tests

- TEST 19: deepest pressure test PRES PRES2 TEMP TEMP2 PSAL PSAL2 CNDC DOXY DOXY2 CHLA CHLA2 BBP700 BBP532
- TEST 21: near-surface unpumped CTD salinity test PSAL DOXY DOXY2
- TEST 22: near-surface mixed air/water test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2
- TEST 6: global range test PRES PRES2 TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2 DOXY DOXY2 CHLA CHLA2 BBP700 BBP532
- TEST 7: regional range test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 9 : spike test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2 DOXY DOXY2 CHLA CHLA2
- TEST 11: gradient test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2 DOXY DOXY2
- TEST 12: digit rollover test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 13: stuck value test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 15: grey list test
- TEST 16: gross salinity or temperature sensor drift test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 18: frozen profile test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 23: deep float with data deeper than 2000 dbar test TEMP TEMP2 TEMP_DOXY TEMP_DOXY2 PSAL PSAL2
- TEST 57: DOXY specific test DOXY DOXY2
- TEST 62: BBP specific test BBP700 BBP532
- TEST 63: CHLA specific test FLUORESCENCE_CHLA



Coriolis BGC-Argo floats, RTQC tests

- We enhanced the test 19 « deepest pressure test»
 - In #RD1, it is specified that PRESSURE_THRESHOLD should be “CONFIG_ProfilePressure_dbar plus 10%”. However, since floats usually have difficulties to precisely stabilize at shallow profile pressure depths, this PRESSURE_THRESHOLD is not suitable for shallow profile pressure configuration values.
 - We decided to use the specified fixed coefficient of 10% only when CONFIG_ProfilePressure_dbar is greatest than 1000 dbar and to use a variable coefficient for shallow CONFIG_ProfilePressure_dbar values.
 - This coefficient is linearly determined so that its value is 10% when CONFIG_ProfilePressure_dbar = 1000 dbar and 150% when CONFIG_ProfilePressure_dbar = 10 dbar.
- Documented in
 - *Argo real time quality controls Coriolis implementation* <https://doi.org/10.13155/49438>



Coriolis BGC-Argo floats, delayed mode BGC

- Oxygen delayed mode data is distributed
 - 27 318 delayed mode files: **51% of the files having oxygen**
 - LOCODOX for visual inspection and DM adjustments
 - ISAS objective analysis configured for oxygen



Coriolis BGC-Argo floats, future plans

- EA-RISE : Euro-Argo Rise project
410 man-months from 19 institutions
 - WP2 : evolution of Core-Argo mission
 - ✓ Use deep learning DMQC techniques to improve the Argo dataset overall quality
 - WP4 : BGC extension
 - ✓ New BGC sensors : NO3 and Irradiance, consistency studies with dual sensors
 - ✓ BGC data management : setup and sustain the European BGC DAC
 - ✓ BGC new products : marine organic and inorganic carbon including oxygen and pH
- Strengthening Coriolis BGC-Argo DAC
 - LOV (Laboratoire Oceanographique de Villefranche) is recruiting a data analyst for BGC delayed mode

← → ↻ ⓘ Non sécurisé | ftp://ftp.ifremer.fr/ifremer/argo/aux/coriolis/6902968

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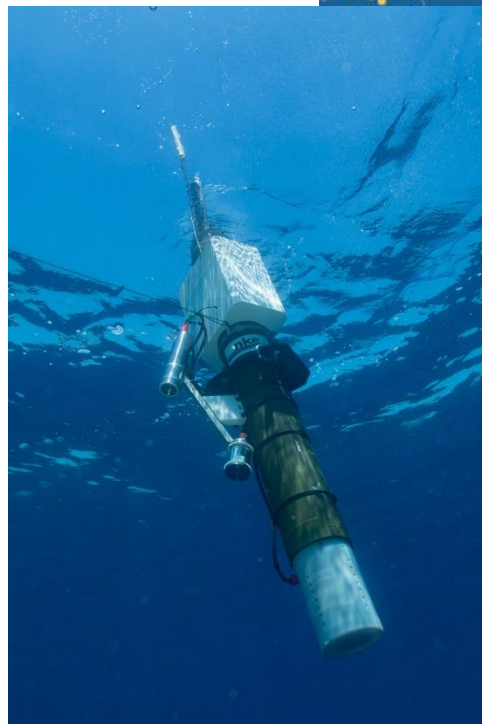
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R6902968_004_aux.nc	55.9 kB	03/10/2019 19:35:00
R6902968_005_aux.nc	55.7 kB	03/10/2019 19:35:00
R6902968_006_aux.nc	55.7 kB	03/10/2019 19:35:00
R6902968_007_aux.nc	54.7 kB	03/10/2019 19:35:00
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R6902968_010_aux.nc	55.0 kB	03/10/2019 19:35:00
R6902968_011_aux.nc	55.0 kB	03/10/2019 19:35:00
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R6902968_017_aux.nc	55.2 kB	03/10/2019 19:35:00
R6902968_018_aux.nc	55.2 kB	03/10/2019 19:35:00
R6902968_019_aux.nc	55.4 kB	03/10/2019 19:35:00
R6902968_020_aux.nc	55.0 kB	03/10/2019 19:35:00
R6902968_021_aux.nc	55.4 kB	03/10/2019 19:35:00
R6902968_022_aux.nc	55.4 kB	03/10/2019 19:35:00
R6902968_023_aux.nc	55.5 kB	03/10/2019 19:35:00
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R6902968_030_aux.nc	55.7 kB	03/10/2019 19:35:00



Deployment of a float equipped with an UVP sensor in Villefranche in 2019

ncdump -h R6902968_002_aux.nc

```
float NB_SIZE_SPECTRA_PARTICLES(N_PROF, N_LEVELS, N_VALUES18) ;
  NB_SIZE_SPECTRA_PARTICLES:long_name = "Number of particles per size class" ;
  NB_SIZE_SPECTRA_PARTICLES:FillValue = 99999.f ;
  NB_SIZE_SPECTRA_PARTICLES:units = "number of particles per litre" ;
  NB_SIZE_SPECTRA_PARTICLES:C_format = "%d" ;
  NB_SIZE_SPECTRA_PARTICLES:FORTRAN_format = "I" ;
  NB_SIZE_SPECTRA_PARTICLES:resolution = 1.f ;
char NB_SIZE_SPECTRA_PARTICLES_QC(N_PROF, N_LEVELS) ;
  NB_SIZE_SPECTRA_PARTICLES_QC:long_name = "quality flag" ;
  NB_SIZE_SPECTRA_PARTICLES_QC:conventions = "Argo reference table 2" ;
  NB_SIZE_SPECTRA_PARTICLES_QC:FillValue = " " ;
```

NB_SIZE_SPECTRA_PARTICLES[,1]

[1] 1.221771e+05 2.910786e+04 0.000000e+00 1.602095e+04 2.769762e

[6] 3.373333e+03 1.102540e+03 6.489683e+02 2.944445e+02 1.053968e

[11] 4.444444e+01 1.642857e+01 7.063492e+00 2.936508e+00 1.031746e

[16] 3.968254e-01 1.587302e-01 0.000000e+00

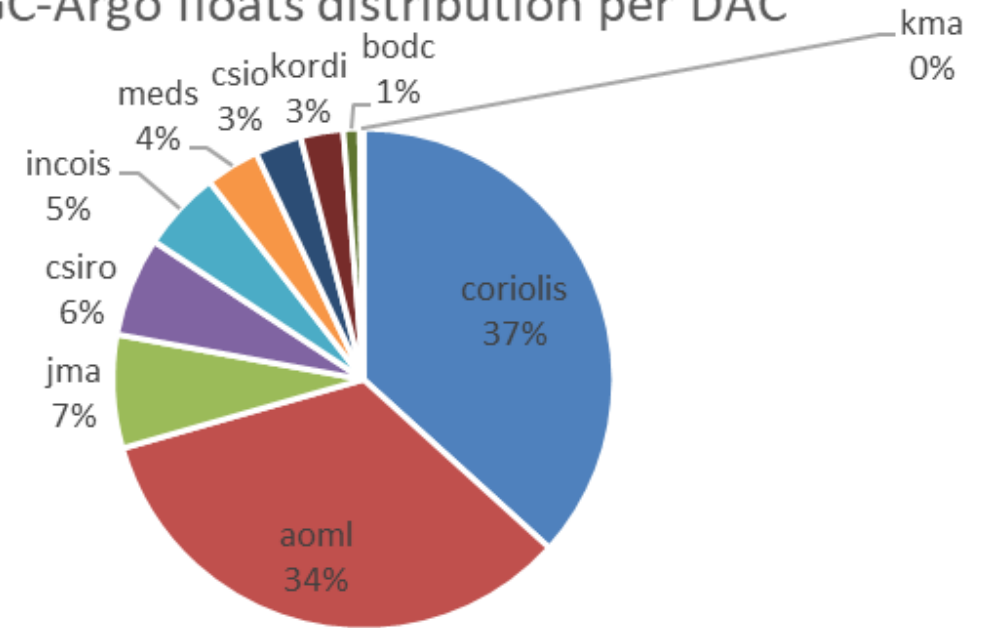


BGC-Argo at GDAC level

- In October 2019, 189.142 BGC-Argo profiles from 1234 floats were available on Argo GDAC. This a fair increase over 2018: +15% more floats 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

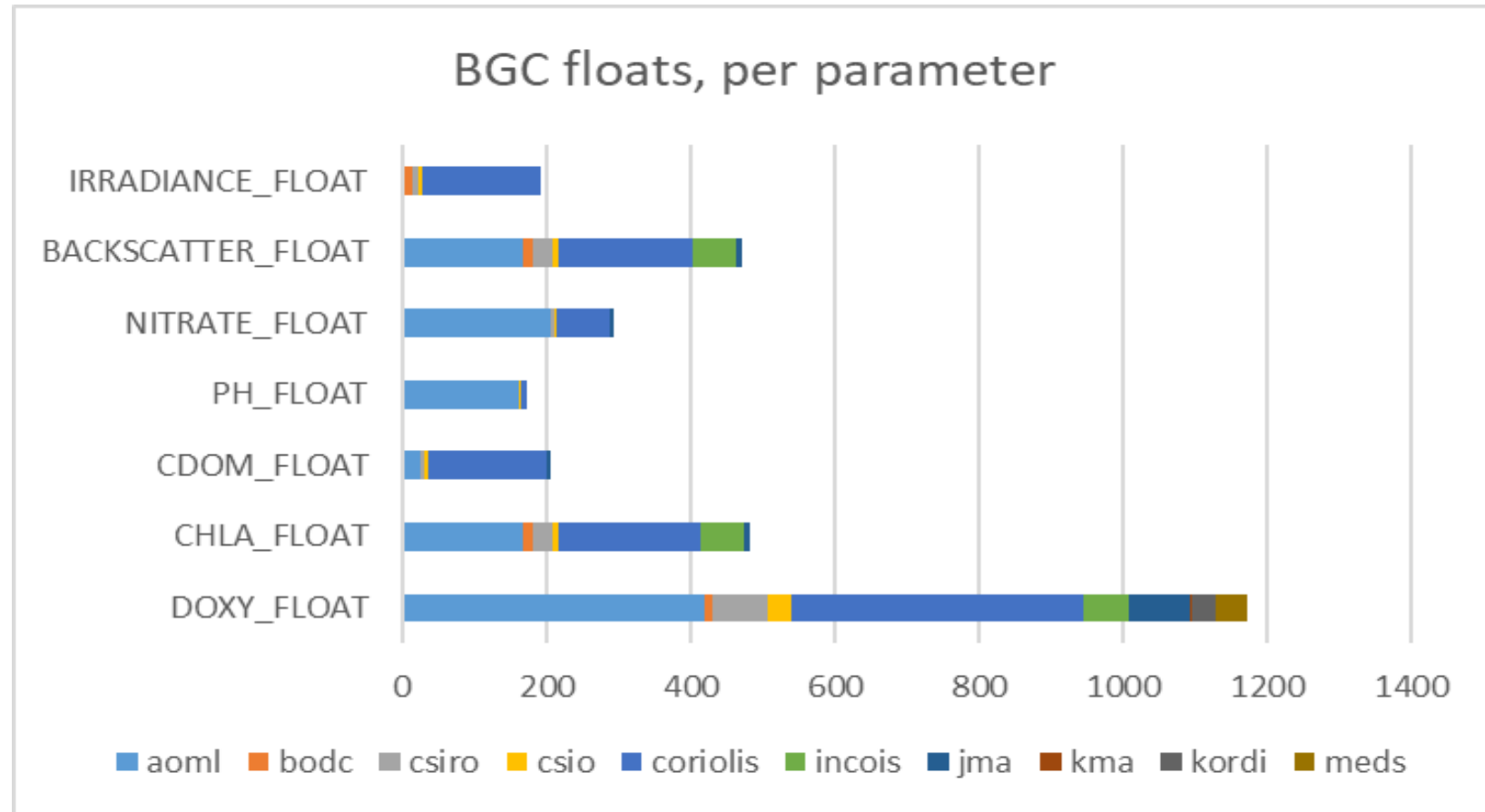
BGC-Argo floats distribution per DAC





BGC-Argo at GDAC level

parameter	nb floats
DOXY_FLOAT	1172
CHLA_FLOAT	481
BACKSCATTER_FLOAT	471
NITRATE_FLOAT	294
CDOM_FLOAT	206
IRRADIANCE_FLOAT	192
PH_FLOAT	171

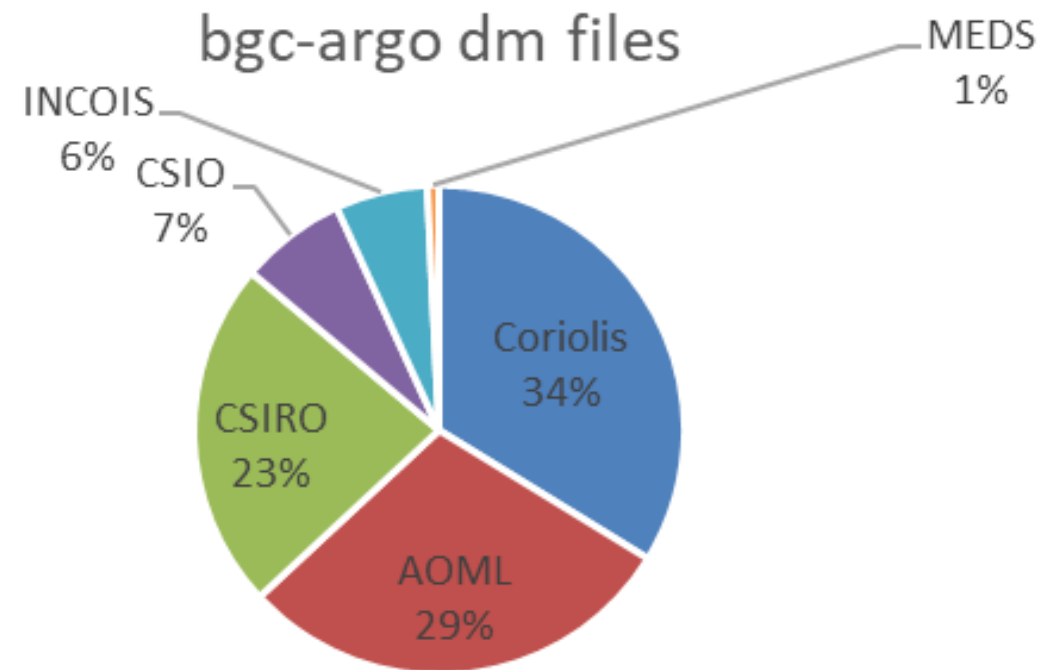




BGC Argo delayed mode file

- 43% of BGC-Argo have delayed mode data (One or more variable d-moded)

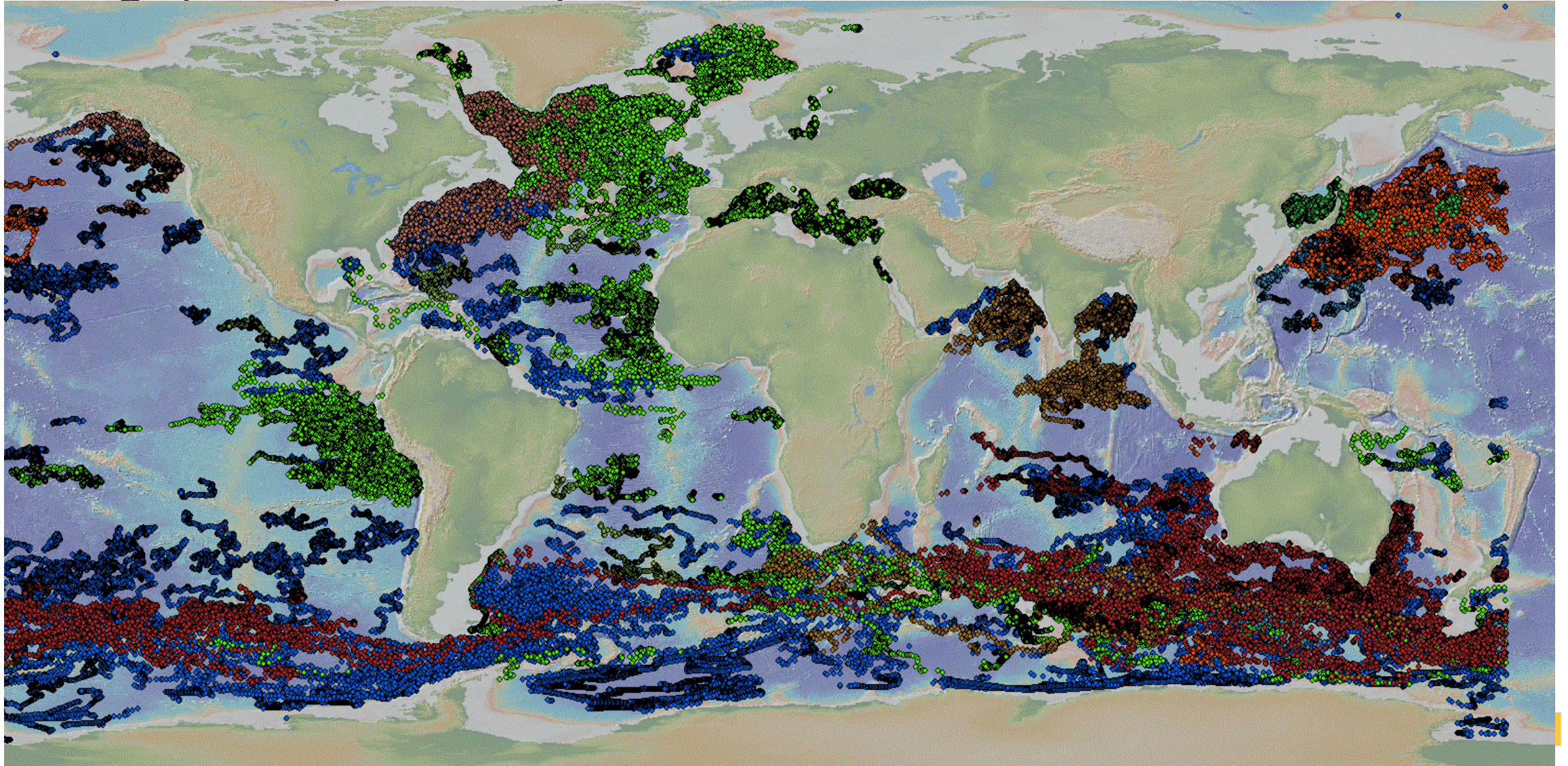
BGC-Argo delayed mode	
DAC	nb files
Coriolis	27 318
AOML	23 700
CSIRO	18 632
CSIO	5 671
INCOIS	4 925
MEDS	619
Total	
80 865	





BGC-Argo at GDAC level

- BGC-Argo profiles, colored by DACs



- BGC-Argo synthetic profiles (S-prof) are now distributed on Argo GDAC ftp server.

- To facilitate the use of BGC-Argo profiles, synthetic cycle profiles are now distributed on Coriolis GDAC from the existing core and BGC Argo profiles.
For each cycle, the existing Argo NetCDF V3.1 profile file contains one or more core-Argo profile (pressure, temperature, salinity) and one or more additional BGC profile (oxygen, chlorophyll, etc...).

Data are stored into two or more arrays ($N_PROF \geq 2$).

To improve co-location of different BGC samples, a merged cycle profile is generated into one single array ($N_PROF = 1$). The core-Argo and BGC observations are vertically aligned on pressure levels.

Detailed specification: *Bittig Henry, Wong Annie, Plant Josh (2019). BGC-Argo synthetic profile file processing and format on Coriolis GDAC.* <https://doi.org/10.13155/55637>

- The index of BGC-Argo synthetic profile files is available on:
 - ftp://ftp.ifremer.fr/ifremer/argo/argo_synthetic-profile_index.txt
- US-GDAC is working on a synchronization of synthetic profiles from Coriolis GDAC.