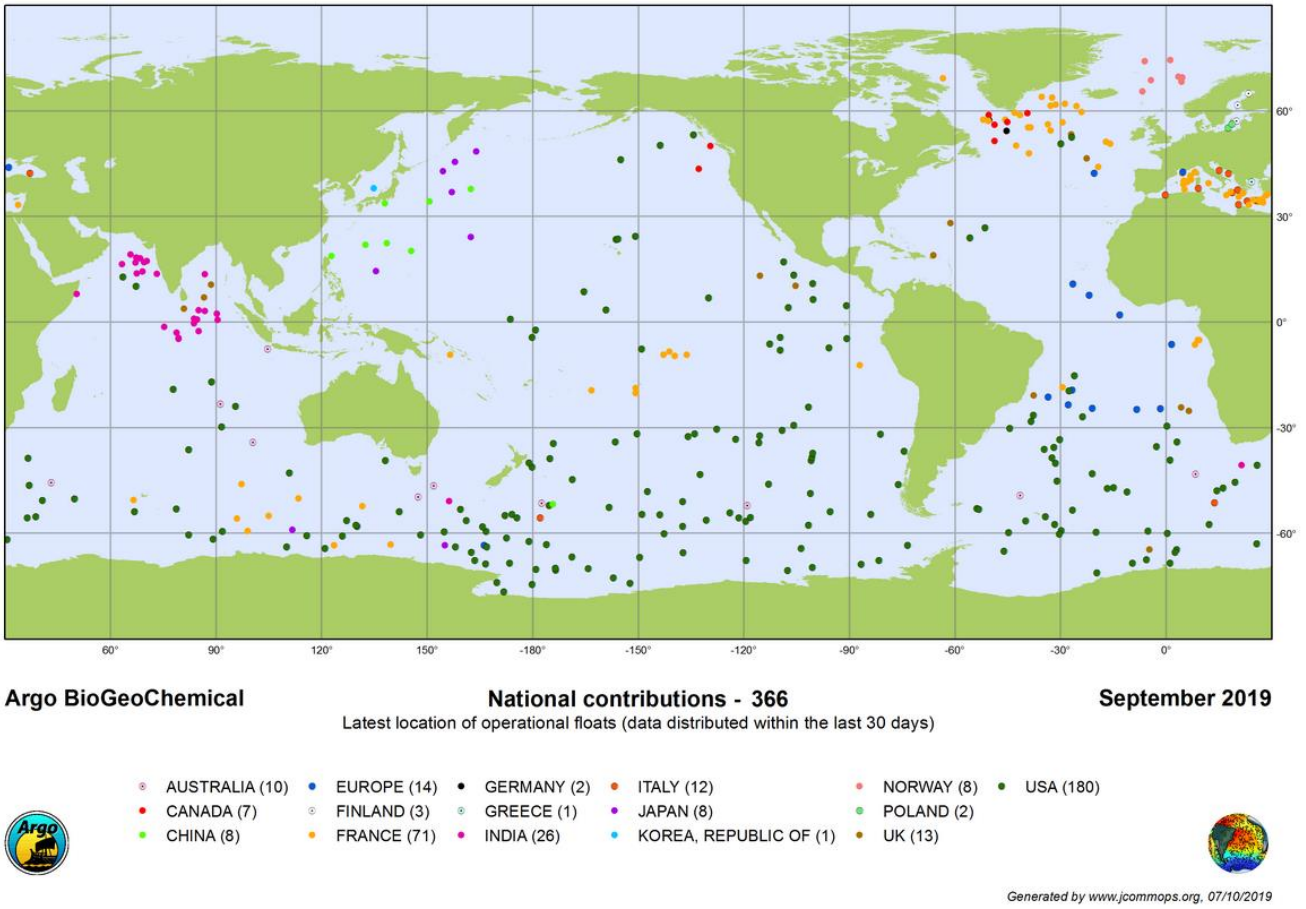
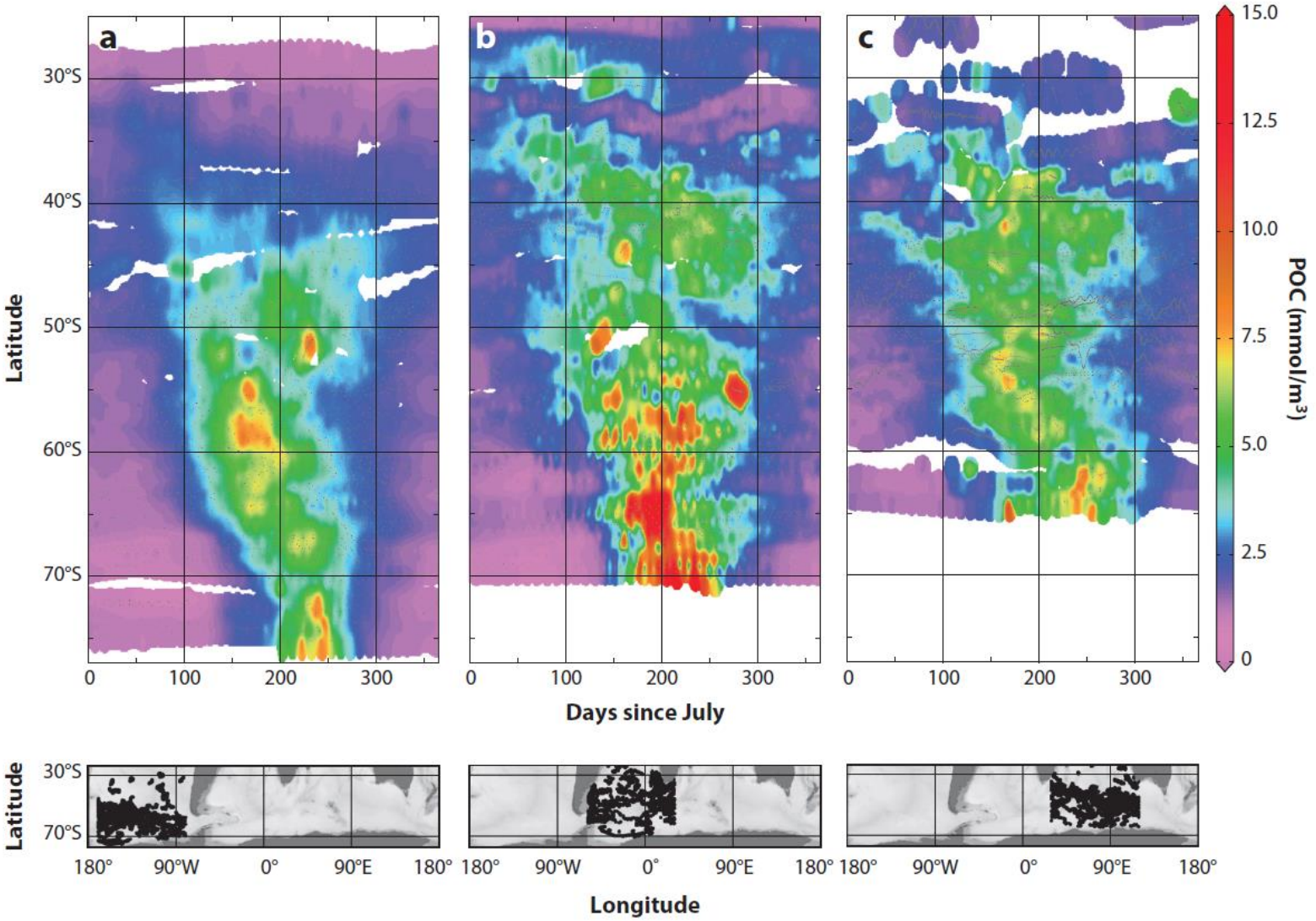
Some thoughts on the future of BGC-Argo and data management

Ken Johnson



BGC-Argo science moving from analysis of 1, or few floats, to basin, or global scale

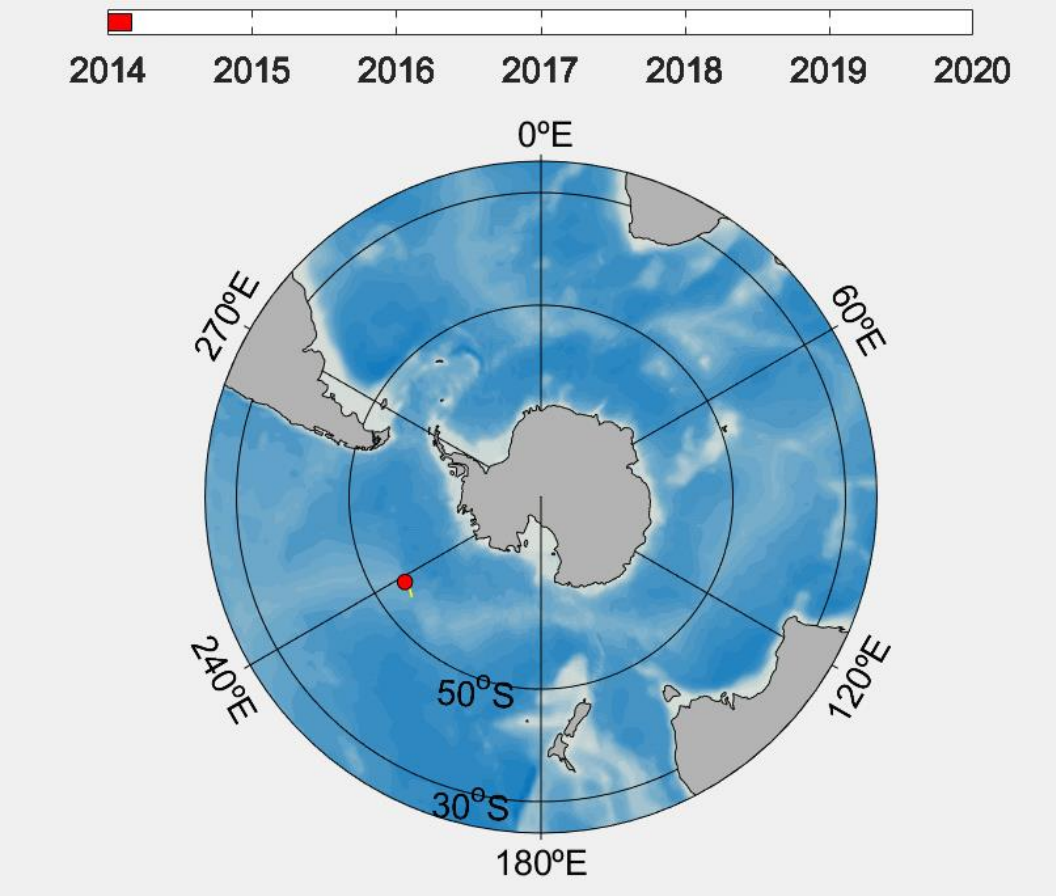


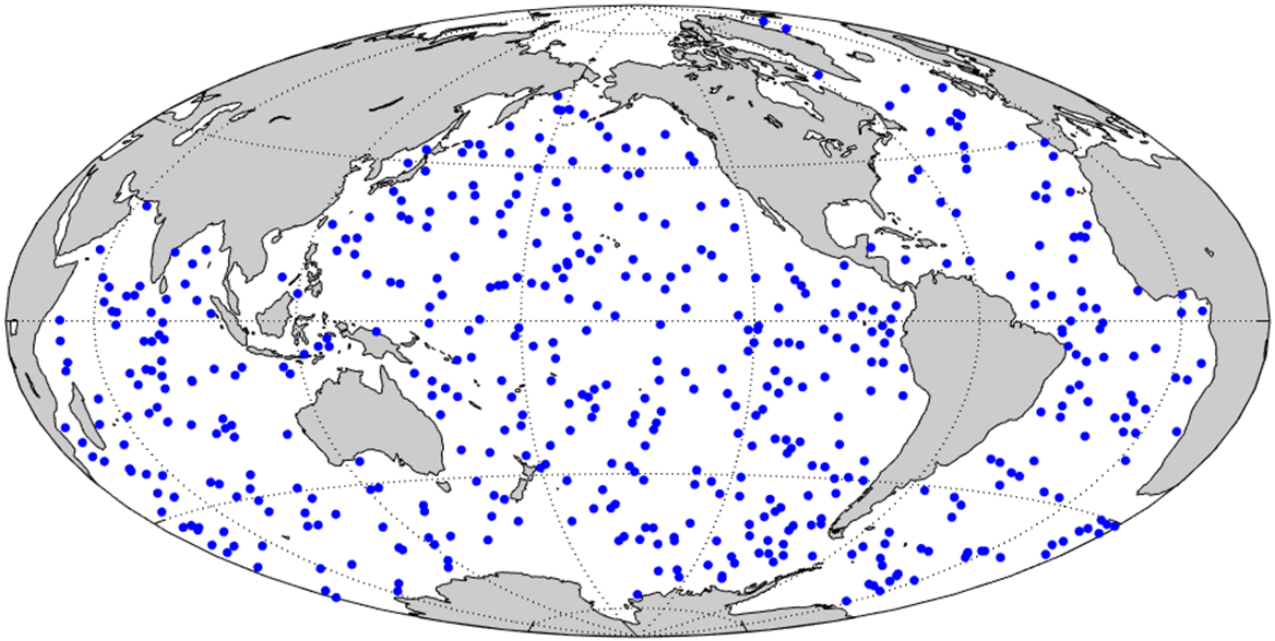
Claustre, Johnson, and Takeshita (2020) Annual reviews of Marine Science

Projects moving from 1 off float deployments to a more sustained model

SOCCOM

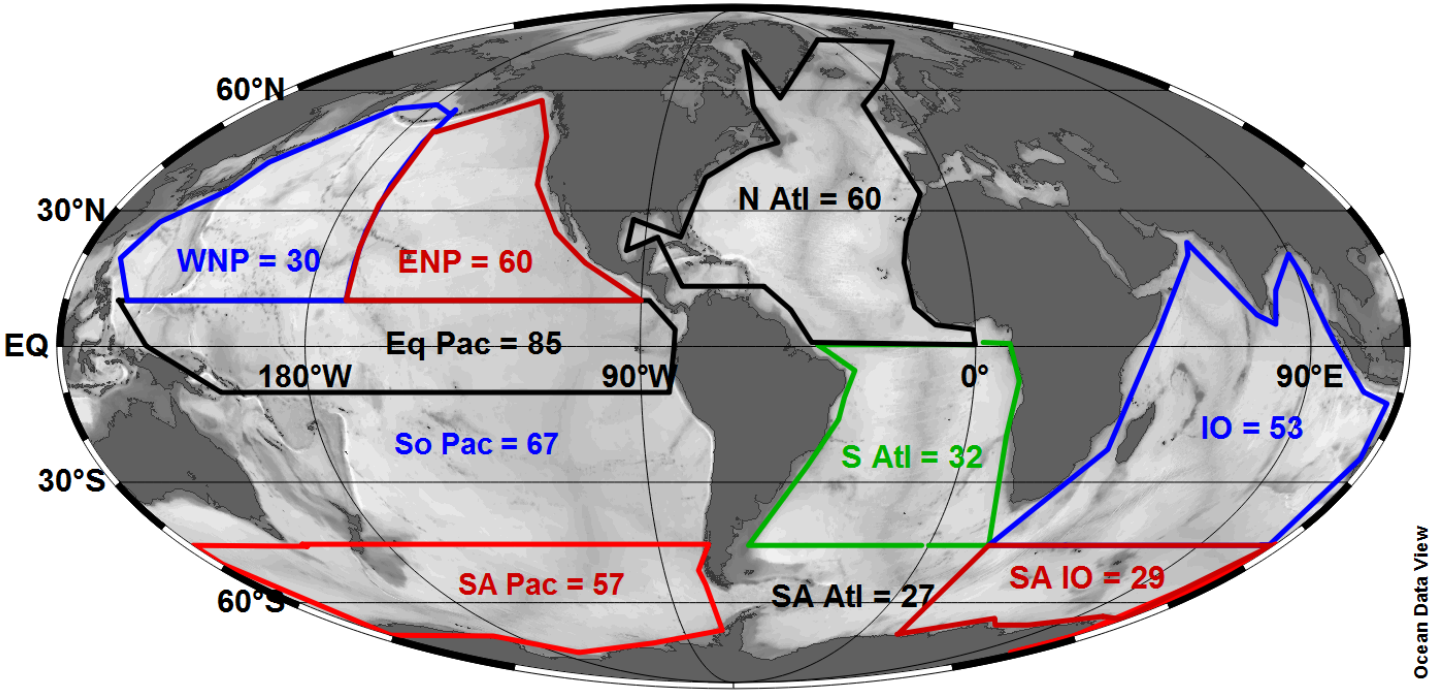
- >150 floats deployed
- 138 operating
- Deploying 30 to 50 floats/y
- Data fully processed and qc’d
- Will continue for 5 more years.





Planning for global arrays moving forward:

- Proposed US BGC-Argo 500 float array
- Deployments would start in Aug. 2020 if funded.



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As we move forward to a global system, multiple challenges remain.

The primary challenge will be producing large amounts of transformative science.

- Is the data system up to the challenge?
    - Next slides are a few examples from papers published in 2019

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ing to particulate optical backscattering coefficient b_{bp} (units of m^{-1}; see supporting information). All the data were downloaded from the Coriolis database (ftp://ftp.ifremer.fr/ifremer/argo/dac/coriolis) and quality controlled (see supporting information). The BGC-Argo floats (more than 35,000 correspondent Chl and b_{bp}

Supporting Information:

The FChla vertical profiles were processed and quality controlled as follows:

(2) Time-series of vertical profiles of Chl for each float were visually checked to identify and remove any profile affected by sensor malfunction or biofouling, which increased noise and spike occurrence. Malfunction and biofouling affected only 9.6% of the profiles.

(3) Profiles with less than 15 records per profile (3% of the database) were removed, being inadequate for further treatment and statistical analysis.

(5) Potential instrument drift was checked on time series of Chl within the 950-1000 m layer as collected by the float when in drift mode following Organelli et al. (2017). Any drift was corrected by applying the time-dependent offset determined from the linear regression of the median values between 950-1000m as a function of time.

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increasingly deployed (Johnson et al., 2017; Thierry & Bittig, 2016). Although the BGC-Argo project intends to develop a global array, only 8% of Argo floats currently have DO sensors (DO-Argo), and quality control is not yet complete due to complex procedures (Johnson et al., 2017; Takeshita et al., 2013; Thierry & Bittig, 2016). Thus, there is great potential for improved understanding of oceanic carbon chemistry processes

North Pacific. We then corrected the DO-Argo data using a linear fit to bottle DO data collected near each DO-Argo float (section S3 and Figure

This data has already been corrected, but are in an offline database!

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DAC	Floats w/ Raw O2 data	Floats w/ QC'd & Adjusted O2 Data	
AOML	417	205	49%
BODC	13	0	0%
CORIOLIS	399	163	41%
CSIO	34	19	56%
CSIRO	75	60	80%
INCOIS	62	0	0%
JMA	7	0	0%
KMA	2	0	0%
KORDI	34	0	0%
MEDS	43	2	5%
ALL	1,086	449	41%

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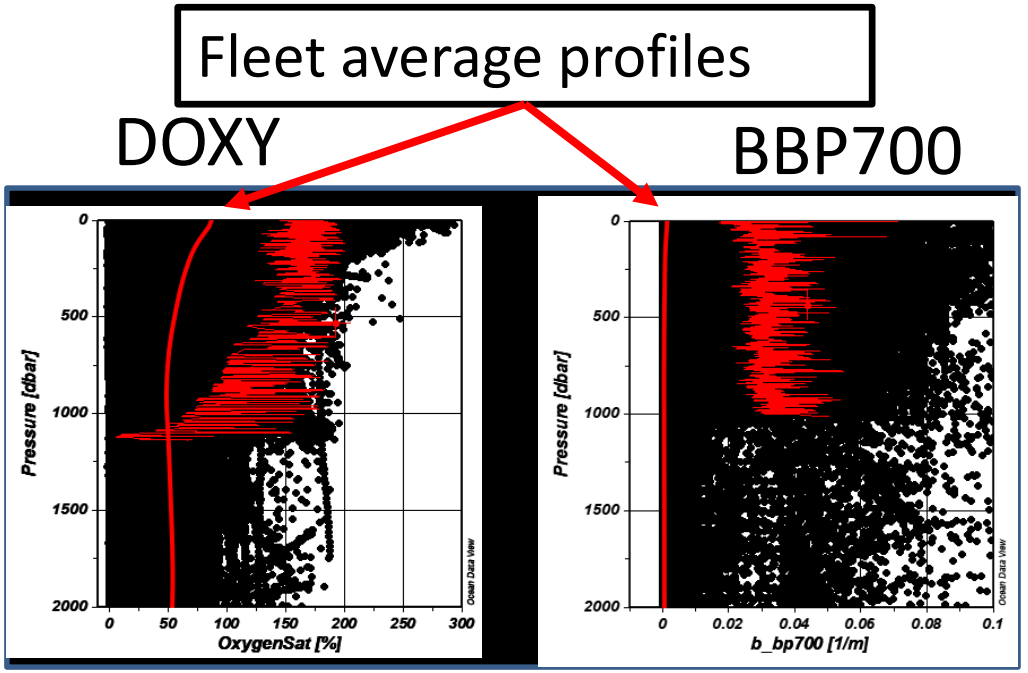
What is the solution?

- The availability of Sprof files now makes it quite easy to process and statistically analyze the entire BGC array.
- Josh Plant will show some examples for analysis of the entire array
- These procedures can be used for real-time QC



How to move forward?

- Each DAC does complete processing.
  - This model has not been fully successful

- One (or a few BGC-DACs) process QC and adjustments in near real-time, and pass the results back to the DACs for incorporation in their files and upload to the GDACs
  - A model built on Core-Argo global assessments of data quality (e.g. Coatanoan or Guinehut reports on anomalies)

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The goal for BGC/ADMT should be to find a way to greatly increase the amount of QC'd and adjusted data:

- The product need not be perfect for real-time adjusted data
- The general user should not have to do massive amounts of QC
- The product can then be incrementally improved
- The process need not follow the traditional Argo model.

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