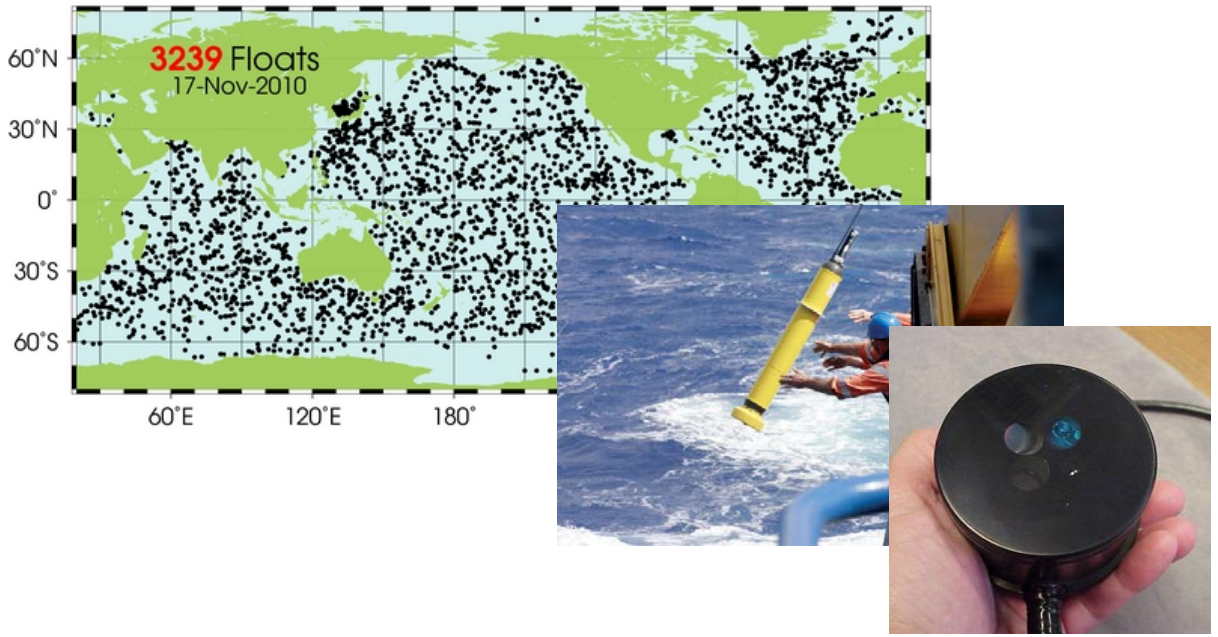
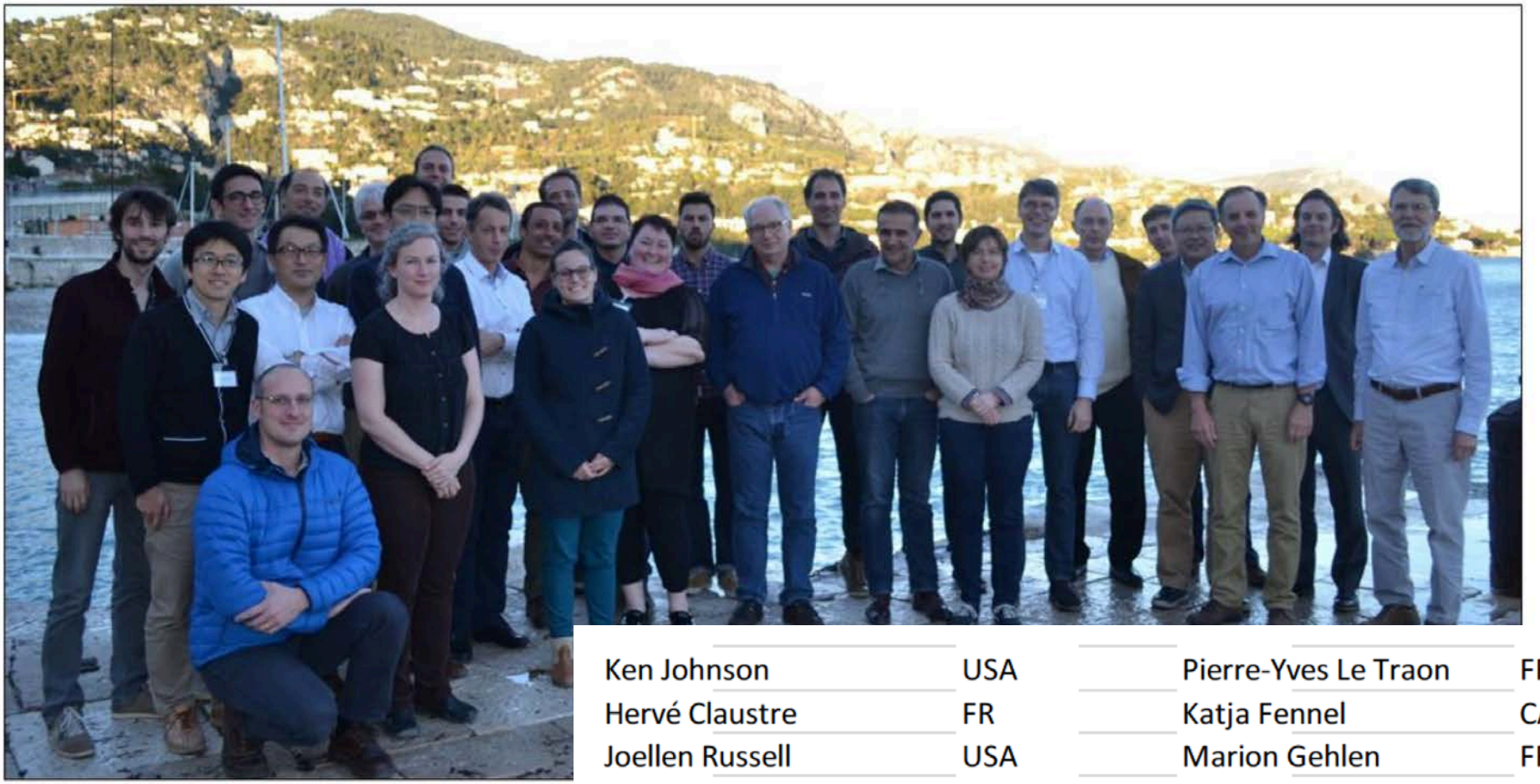
5nd Bio-Argo Workshop
September 26-27 2016, Tjanjin, China

Synthesis -recommendations

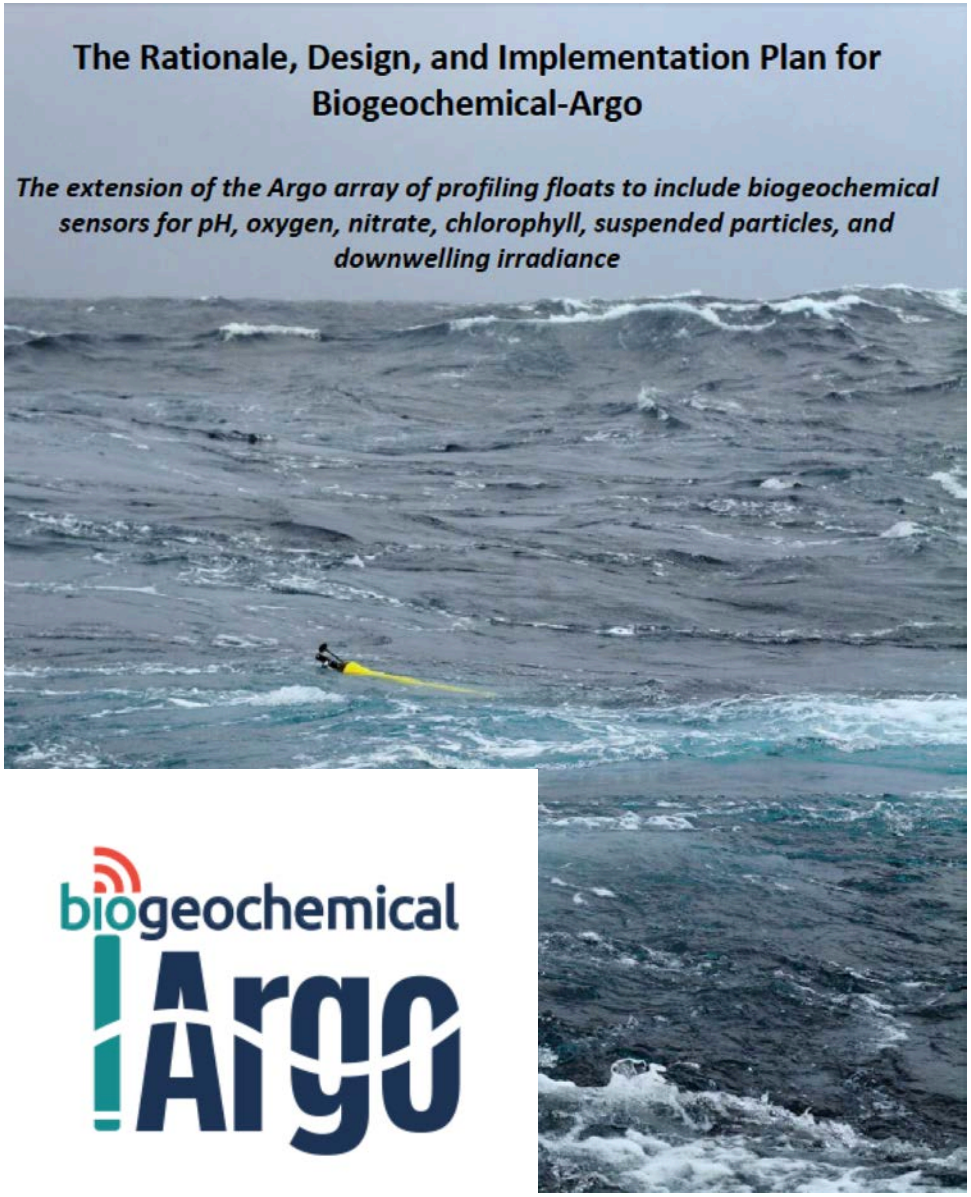




Villefranche-sur-mer, January 11-13, 2016

Ken Johnson	USA	Pierre-Yves Le Traon	FR
Hervé Claustre	FR	Katja Fennel	CAN
Joellen Russell	USA	Marion Gehlen	FR
Pierre Brasseur	FR	Masao Ishii	JP
Steven Riser	USA	Shigeki Hosoda	JP
Jorge Sarmiento	USA	Toshimasa Doi	JP
Arne Kortzinger	GER	Tetsuichi Fujiki	JP
Emmanuel Boss	USA	Haili Wang	China
Giorgio D'alomo	UK	Michele Barbier	FR
Nick Hardman-Mountford	AUS	Alison Gray	USA
Fabrizio Dortenzio	FR	Mathieu Belbeoch	FR
Steve Piotrowicz	USA		

Meeting outcomes



- Science and implementation plan for the Biogeochemical-Argo program reviewed and discussed by the community (Argo, IOCCP, IOCCG, IMBER, SOLAS). released in October
- Presentation at the Global Climate Observation System meeting (March 2016)
- EOS featured article in press.
- Website release in October

Six core (essential) Biogeochemical-Argo variables

- **Oxygen** [1,3,4]
- **Nitrate** [1,4]
- **pH** [1,4]
- **Chlorophyll a** [2,3,4]
- **Backscattering** [3]
- **Irradiance** [3,4]

1 Essential Ocean Variables: EOVs:
2 Biological Ecosystem Ocean Variables : Biological eEOVs
3 Biogeochemistry Ecosystem Ocean Variables: Biogeochemistry eEOVS
4 Essential Climate Variables (ECVs), either oceanic or atmospheric:

The key scientific questions

Ocean science research

- Will ocean carbon uptake continue at the same relative rate as the ocean warms? (**Carbon uptake**)
- How does the volume of Oxygen Minimum Zones change in time? How does this affect the cycling of nitrate? (**OMZs and NO3 cycle**)
- What is the variability and trend in ocean pH? How does the changing carbonate saturation state affect biogeochemical processes? (**Ocean acidification**)
- What are the interannual variations in the biological carbon pump? Will its strength be reduced in a warmer ocean? (**Biological Carbon pump**)
- What is the composition of phytoplankton communities? How will it affect higher trophic levels and carbon cycling? **(Phytoplankton communities)**

Ocean Management

- Does real time data improve management of living marine resources? (**Living marine resources**)
- Does an improved ocean carbon budget lead to greater constraints on terrestrial carbon fluxes and a better understanding of global actions to reduce atmospheric CO2? (**Carbon budget verification**)

Emergent phenomena

Generic recommandations

- Verify the grey list accommodate for BGC sensors. Thierry
- Provide monthly snapshots for the metadata anomalies (Henry's template). Antoine
- Produce Biogeochemical-Argo doucment (operational point of view, good practices) "BGC-Argo for dummies". Emmanuel, Henry & Antoine
- Provide a documentation in FAQ that BGC-floats can surface at regular interval or specific time. Henry
- Write a cookbook for BGC trajectory Btraj. Catherine & Jean-Philippe
- Provide sub-routines for calculation for variables and derived variables. Ken
- Test netcdf4 format on merge file for the size. Who?
- Interact with JCOMMOPS to improve the map representativeness. Catherine & Henry
- Develop a restricted user-list to share tools and codes (ADMT page host a landing page for these tools). Catherine

O2

- New versions of the decoding and QC cookbook for O2 were presented and validated
- The decoding cookbook now takes into considerations all the recommendations the SCOR WG142
- Need to investigate the quality of oxygen in the trajectory file to check whether we need to update the RT-QC test. Who?
- Relax the RT QC test for deep data DOXY & TEMP_DOXY. Data > 2000 db keep QC=1
- Set QC=3 when PSAL-QC=4
- Develop a QC test for hook O2. Virginie
- Set QC=1 instead of QC=2 for data adjusted in real-time
- Define an in air-based RT adjustment method for O2. Ken, Henry & Seth (Bushinsky)
- Cookbook will be updated according to these changes.

NO3

- Character length of 4096 for the predeployment_calib_xxx is adopted
- Finish the pressure dependence investigation of bromide absorption (Ken)
- Define an RT adjustment method for NO3 [Ken, Raphaëlle (Sauzède), Hervé]
- Draft the QC documentation for NO3 [Ken & Catherine & Orens (Pasrqueron)]

pH

- Write the document processing pH at the DAC level (Ken, Catherine & Antoine)
- Define an RT adjustment method for pH (Ken, Raphaëlle & Henry)
- Draft the QC documentation for pH (Ken & Catherine, Henry)

Chla

- Deep /dark fluorescence signal: develop an operational procedure (Xing et al., in press) for implementation in RT Update the documentation accordingly (Catherine, Hervé & Emmanuel).
- Deep /dark fluorescence signal: when CDOM data are available, implementation of a DM procedure. (Xing, Hervé)
- Finish the NPQ investigation (Emmanuel, Xing & Hervé)
- Finish the investigation of the bias of factory calibration. Once published in peer-review literature, put the correction factor in the PREDEPLOYMENT_CALIB_XXX (Hervé, Emmanuel, Catherine)
- Test the feasibility of DM QC monitoring drift at depth (raw data) and OCR surface (Antoine & Emmanuel)
- Cross check of Chla and bbp for DM QC (Antoine & Emmanuel)
- DM: Cross checks Kd-derived Chla and Fchla for DM metrics (Antoine, Xing & Emanuel)

CDOM

- Produce the documentation “processing CDOM at the DAC “level” (required for DM Chla). Catherine & Emanuele (Organelli)

bbp

- Action : correct the khi , angle and sensor at the DAC level (Antoine & Uday & Ken & Rebecca)
- Update the processing "backscattering at the DAC level" document (Catherine)
- Update Tables 25 and 27 with MCOMS and FLBB_2K (Catherine)
- Compare and investigate the reason for the values of b_{bp} at depth derived by different DACS in similar region might differ (Antoine and Emanuel)
- Test the feasibility of DM QC monitoring drift at depth (raw data) and OCR surface (Antoine and Emmanuel)
- Cross check of Chla and bbp for DM QC (Antoine & Emmanuel)

Irradiance

- Develop a RT procedure based on clear sky model for irradiance range (or provide look up table: Antoine, Emmanuele & Emmanuel)
- Draft the QC documentation for irradiance. (Emmanuel & Emmanuele & Catherine)
- DM: Take into consideration the temperature dependence of the sensor dark. (Antoine, Nathan, Emmanuele)

Data management status for the six variables

	Processing at the DAC level	RT-QC	DM-QC
Oxygen	DOI 10.13155/39795	DOI 10.13155/40879	DOI 10.13155/40879
Nitrate	on going	on going	on going
pH	on going	on going	on going
Chla	DOI 10.13155/39468	DOI 10.13155/35385	on going
b_b	DOI 10.13155/39459	soon	on going
radiometry	soon	soon	on going