Facts

• Bio-ARGO is in operational status in ARGO thanks to significant effort of bio-community

- «Proval» float is proposed as a complementary means for validation and calibration (not autonomous operation).
Facts

- Bio-ARGO is in operational status in ARGO thanks to significant effort of bio-community.

- The QC RT has been implemented (dec. 14) in the Corilolis centre and has started operational QC and delivery in // to ARGO.

- After some regular QC and specific care about systematic error between floats, we believe that bio-floats could be a very good contributor to operational OC/OLCI verification and to validation to some extent.

- « Proval » float is proposed as a complementary means for validation and calibration (not autonomous operation).
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

Antoine Mangin (ACRI-ST) and Xiaogang Xing (OUC/Takuvik)

Focus on:
1. Recent progress of the bio-Argo technology and deployments
2. Harmonised protocol for sampling and QC
3. R&D works on blending EO data and bio-floats(towards a 3D picture)
4. Near future of the bio Argo network
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

Presentation have been prepared to facilitate discussions on the deployment strategy of bio-floats and the synergy with ocean colour remote sensing from space (e.g. strategies for cross-validation)

The History and perspective: X. Xing
Calibration of EO data: E. Boss
How to CROSS-qualify and validate OCR and the Bio-Argo data: A. Mangin
QC of Kd data from Bio-Argo – a step toward bioregionalisation: E. Organelli
The 3D picture: R. Sauzède
Regional approach – Indian Ocean: N. Hardman-Mountford
Regional approach – Arctic: M. Babin

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

The History and perspective: X. Xing

More funded projects for Bio-Argo floats
(main deployment plans)

- 50+ floats
  PI: H. Claustre (LOV)
- 200+ floats in the SO
  PI: K. Johnson (MBARI) & S. Riser (UW)
- 50+ floats in the Med Sea
  PI: F. D’Ortenzio (LOV)
- 10+ floats in Arctic
  PI: M. Babin (Takuvik)
- 50+ floats in the Indian Ocean
  PI: N. Hardman-Mountford (CSIRO) & M. Ravichandran (INCOIS)

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

Calibration of EO data : E. Boss

Results from NOPP/NASA effort (6 floats, 4 λ)

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

How to CROSS-qualify and validate OCR and the Bio-Argo data: A. Mangin

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

QC of $K_d$ data from Bio-Argo – a step toward bioregionalisation: E. Organelli

$K_{bio} (K_d(\lambda)-K_w(\lambda))$ at the global scale

- $K_d(380)$ are higher than $K_d(490)$, in agreement with global bio-optical models (e.g., Morel and Maritorena, 2001).
- Differences appear among regions.

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

The 3D picture: R. Sauzède

SOCA-BBP validation using 2 time series from the « independent » floats

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

Regional approach – Indian Ocean: N. Hardman-Mountford

Time from plateau controls biomass

Water parcel ages since leaving the Kerguelen Plateau, from altimetric geostrophic back-trajectories (redrawn from d’Ovidio et al., 2015).

Decrease of water column Chl-a inventories with water parcel ages. Light blue: bio-profiler #1; dark blue: bio-profilers #2,3,4; lines: medians; inset: sampling statistics.

Grenier, Della Penna, Trull (2015) BG

Thanks to all speakers!
Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

Regional approach – Arctic: M. Babin

BB2: 500m, 750m, 1000m (21 d)

Note that probability of ejection to Labrador Sea via southern trajectories is reduced with increasing drift/profile depth.

Thanks to all speakers!
Key questions that have been addressed during this breakout session

1. How do we ensure link between fiducial reference quality data and ongoing QC of float data?

2. How biogeochemical and bio optical cruises for deployment of Bio-Argo should be organized?

3. Elements of needs for cooperation between OCR and Bio-Argo

4. Criteria for optimization of bio-Argo deployment (in complementarity with other observations means)
1. How do we ensure link between fiducial reference quality data and ongoing QC of float data?

- Deployment in // to Boussole or Moby (practically delicate)
- CTD cast next to the float deployment with a "golden" sensor (radiometry, ....) + samples at 3 depths of POC and chlorophyll (for HPLC analysis).
- Continuous analysis of float observations against remote sensing products over the whole life of the floats to:
  - determine if drift may have occurred and
  - "calibrate" the fluorometer to the satellite chlorophyll product.
- Measurement of the dark signal
OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

2. How biogeochemical and bio optical cruises for deployment of Bio-Argo should be organized?

- International collaboration between cruises for coordination of opportunities/deployment (eg?) and recovery of floats.

- IOP and AOP measurement (3-5 days) from ship at a given location in // with calibration of bio-Argo (or VAL-Argo) - then float is launched to provide the temporal evolution.

- How to access Bio-Argo data? (a rather exhaustive list would be appreciated)
OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

3. Elements of needs for cooperation between OCR and Bio-Argo

For QC / validation
• Matchups optimization
• Cross-QC
• Cross-validation

For exploitation
• Access to the 3D-picture
• Identification of Bio-optical anomalies (for VAL-Argo deployment)
OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

4. Criteria for optimization of bio-Argo deployment (in complementarity with other observations means)

• Optimization by modelling (trajectories optimization vs bioregions)

• The big game (top-down approach)

  3 types of floats (see Claustre et al., Oceanobs 2009)

  • The **bio-Argo float** : improve biological monitoring (400-500)

  • The **Carbon-float** : phenomenological/process studies (20-40)

  • The **Val-float** : to support EO-ocean colour validation (20-40)

Target : full deployment : bio-Argo float close to 20% of the Argo float (~600 floats)

Still, OC and BioArgo are needed for bio-regionalisation
More than 50 bio-regions
Bio-regions / classification of Chla time series / 10 classes
(Same approach as D’Ortenzio et al., 2009)
Seasiderendezvous.eu/mapmatchup
OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

OC side

Flagging
New calibration

Cross QC
Cross validation

matchups

Bio-Argo side

Flagging
New calibration

Cross calibration with specific floats

Bioregions identification

Regional algorithms

Detection of optical anomalies

Regional algorithms

Deployment strategy

Bioregions confirmation

Deployment

Detection of optical anomalies

The common 3D picture
Assimilation/modelling/blending/statistical assemblage
OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

OC side

Flagging

New calibration

Cross QC

Cross validation

Matchups

Bio-Argo side

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New calibration

Cross calibration with specific floats

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Assimilation/modelling/blending/statistical assemblage

Do we remove the grey?