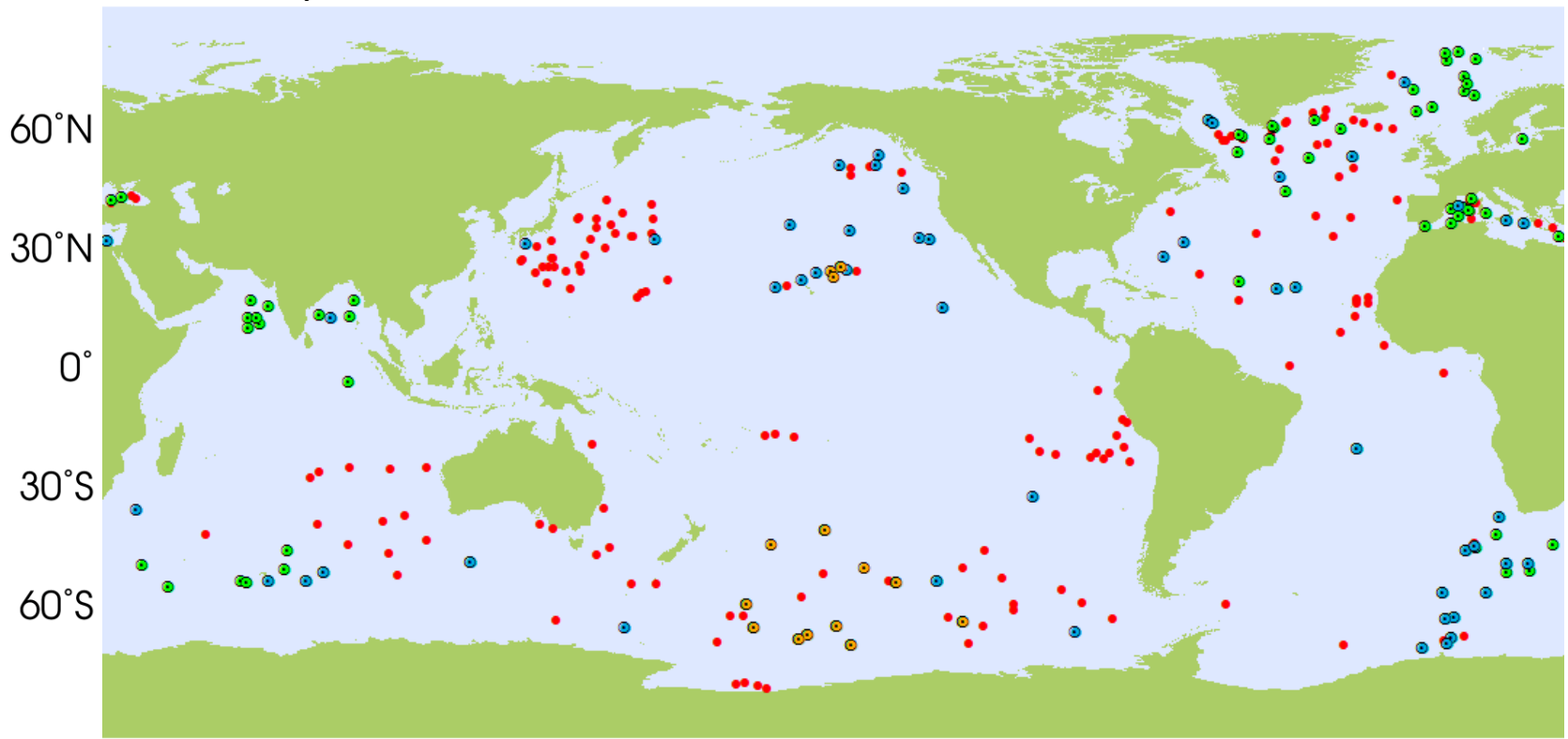


## Breakout session #10 - Joint use of Bio-Argo and Ocean Colour – session report

### Facts

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



Bio-Argo (277)

• Dissolved Oxygen (262)

• Bio-optics (92)

• Nitrate (61)

• pH (14)

April 2015



## Breakout session #10 - Joint use of Bio-Argo and Ocean Colour – session report

### 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 Coriolis 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)

Founded by

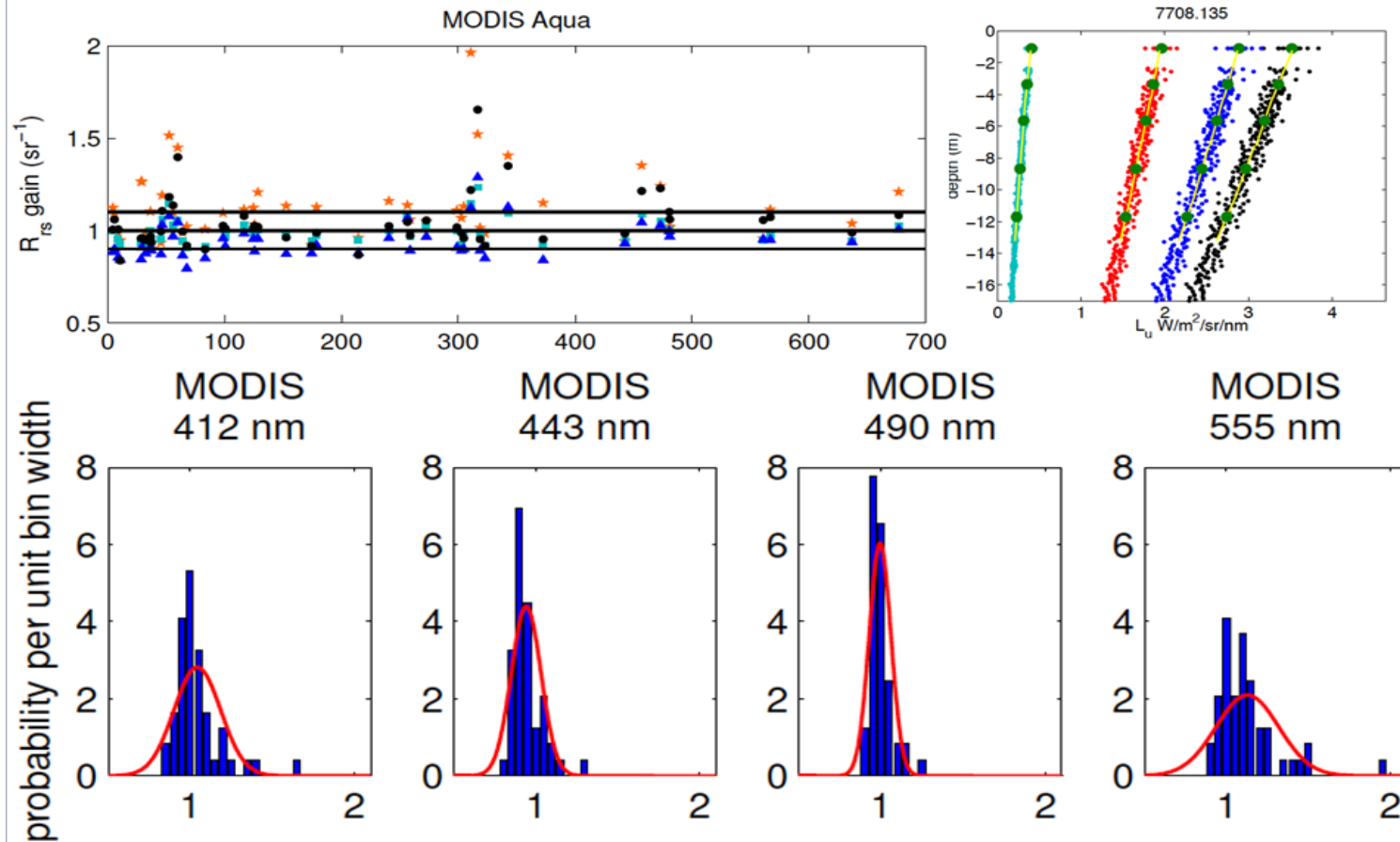


Thanks to all speakers !

# 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 $\lambda$ )



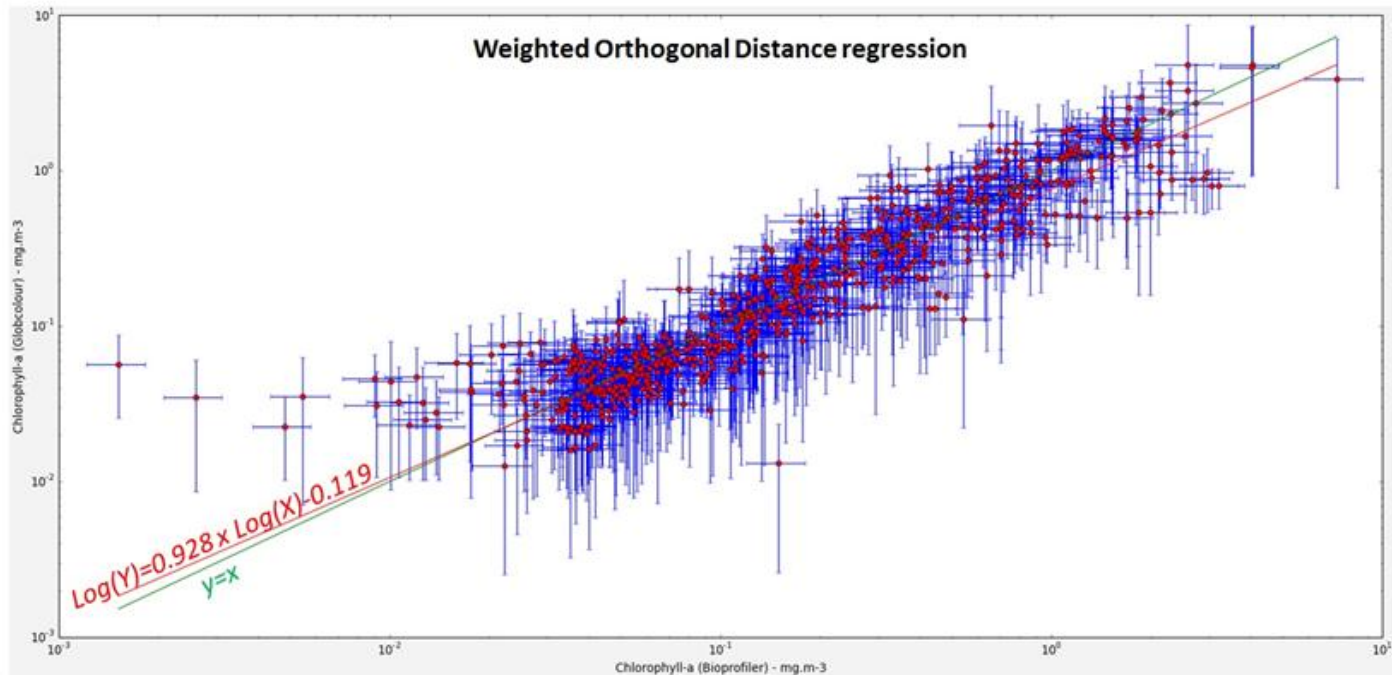
Thanks to all speakers !

## 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*



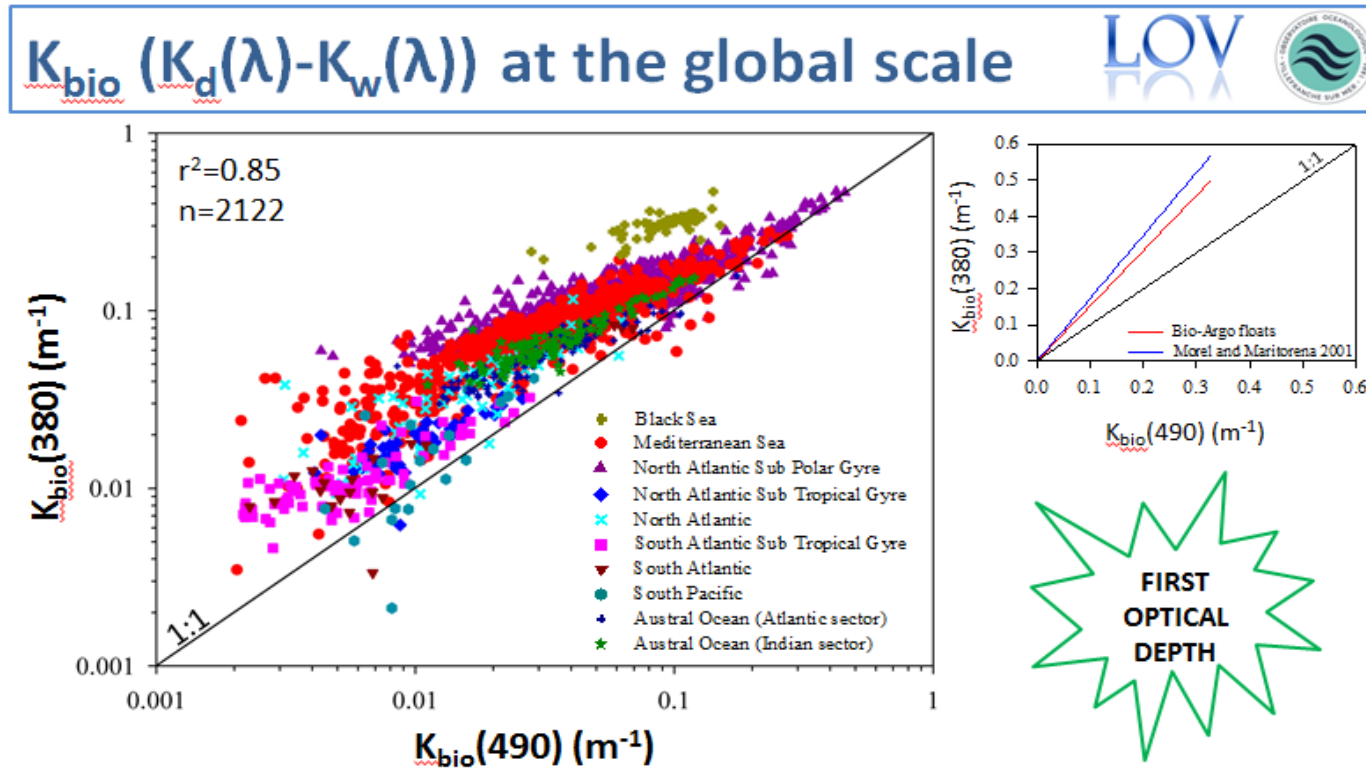
Matchups



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



- $K_d(380)$  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

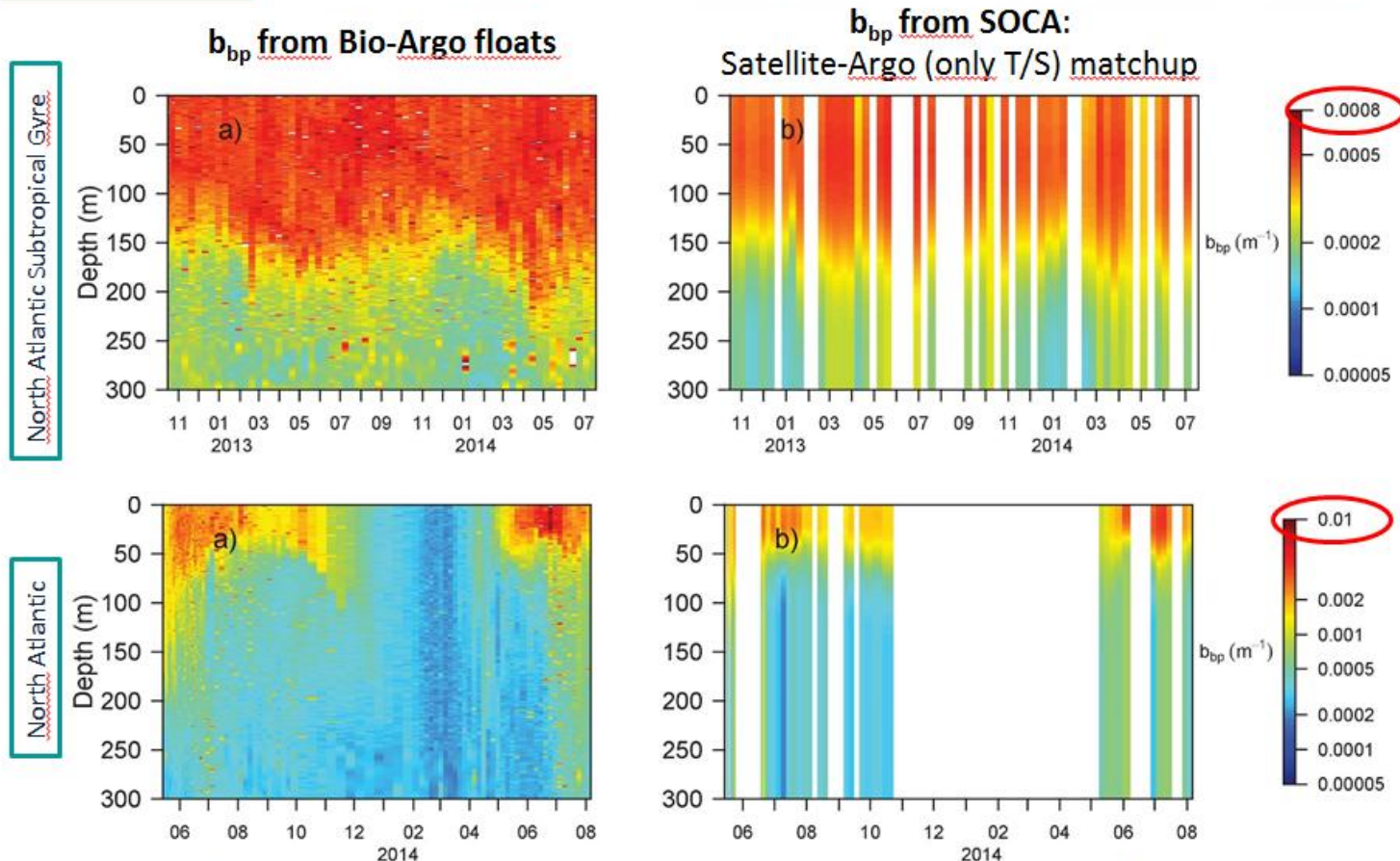
INTRODUCTION

METHOD

RESULTS

CONCLUSION

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



18th of June 2015

IOCCS 2015

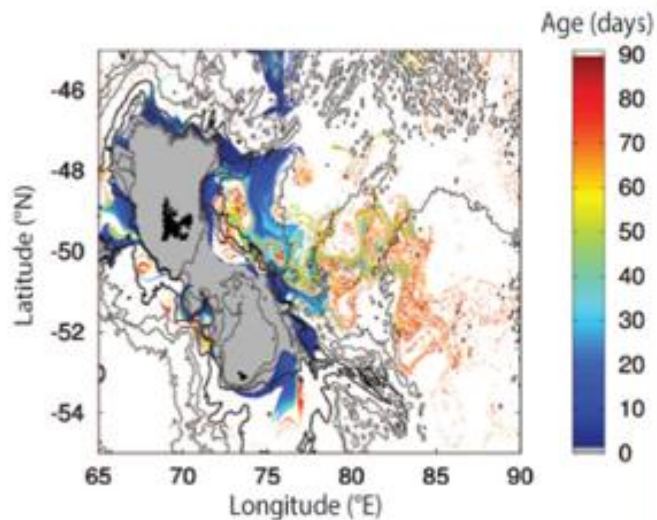
Sauzède et al., In prep.

Thanks to all speakers !

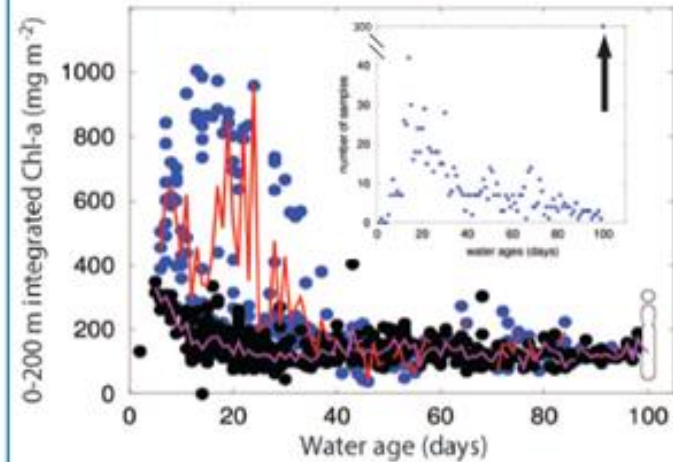
## Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

*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).



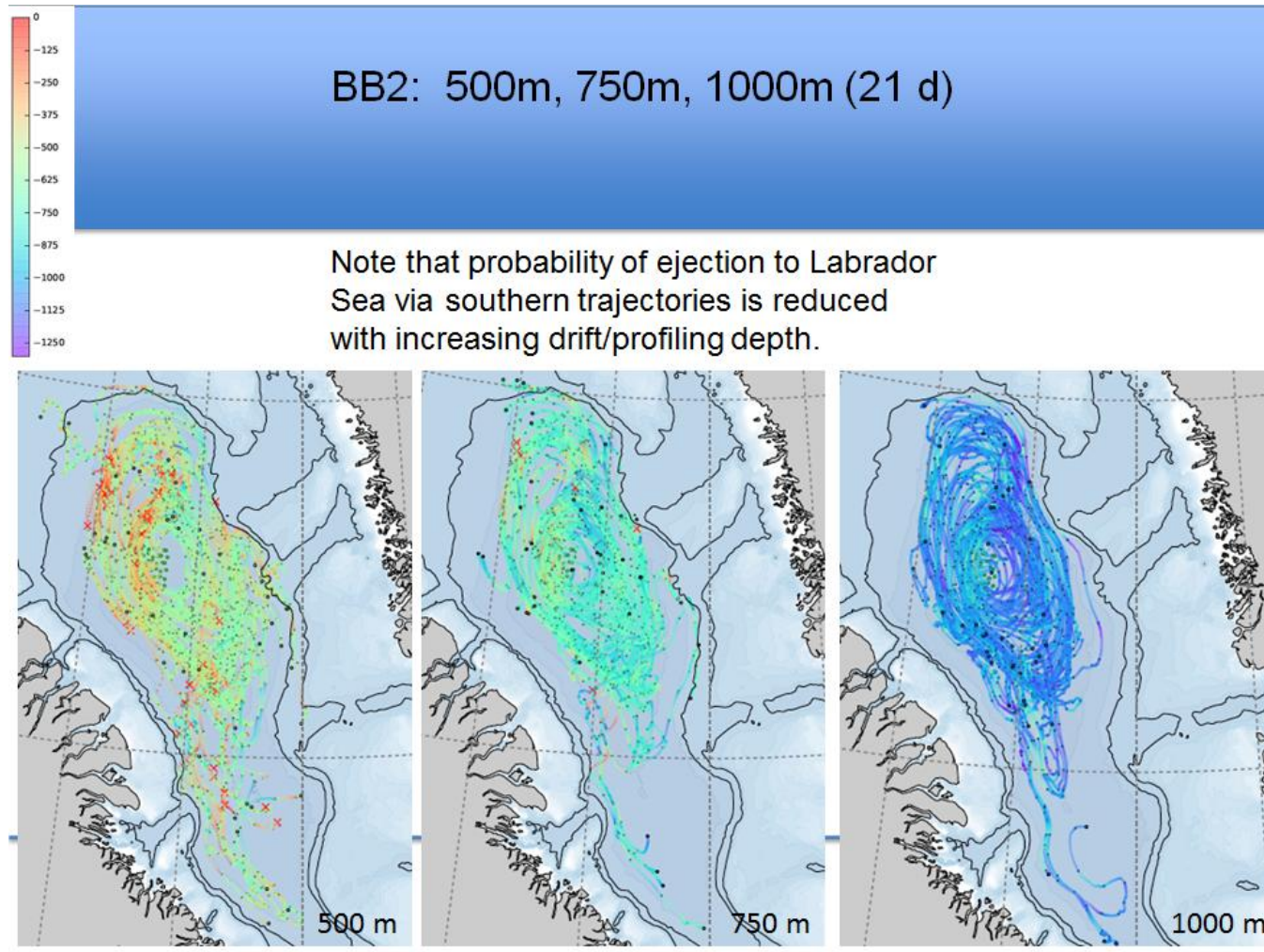
Decrease of water column Chl-a inventories with water parcel ages. Light blue: bio-profiler #1; dark blue: bio-profilers #2,3,4; lines: medians; inset: sampling statistics.

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*

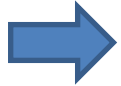
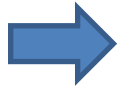


Thanks to all speakers !

## Breakout session #10 - Joint use of Bio-Argo and Ocean Colour

### 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)



## OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

### **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

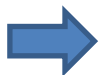
### 4. Criteria for optimization of bio-Argo deployment (in complementarity with other observations means)

- Optimization by modelling (trajectories optimization vs bioregions)
- The big game (top-down approach)

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

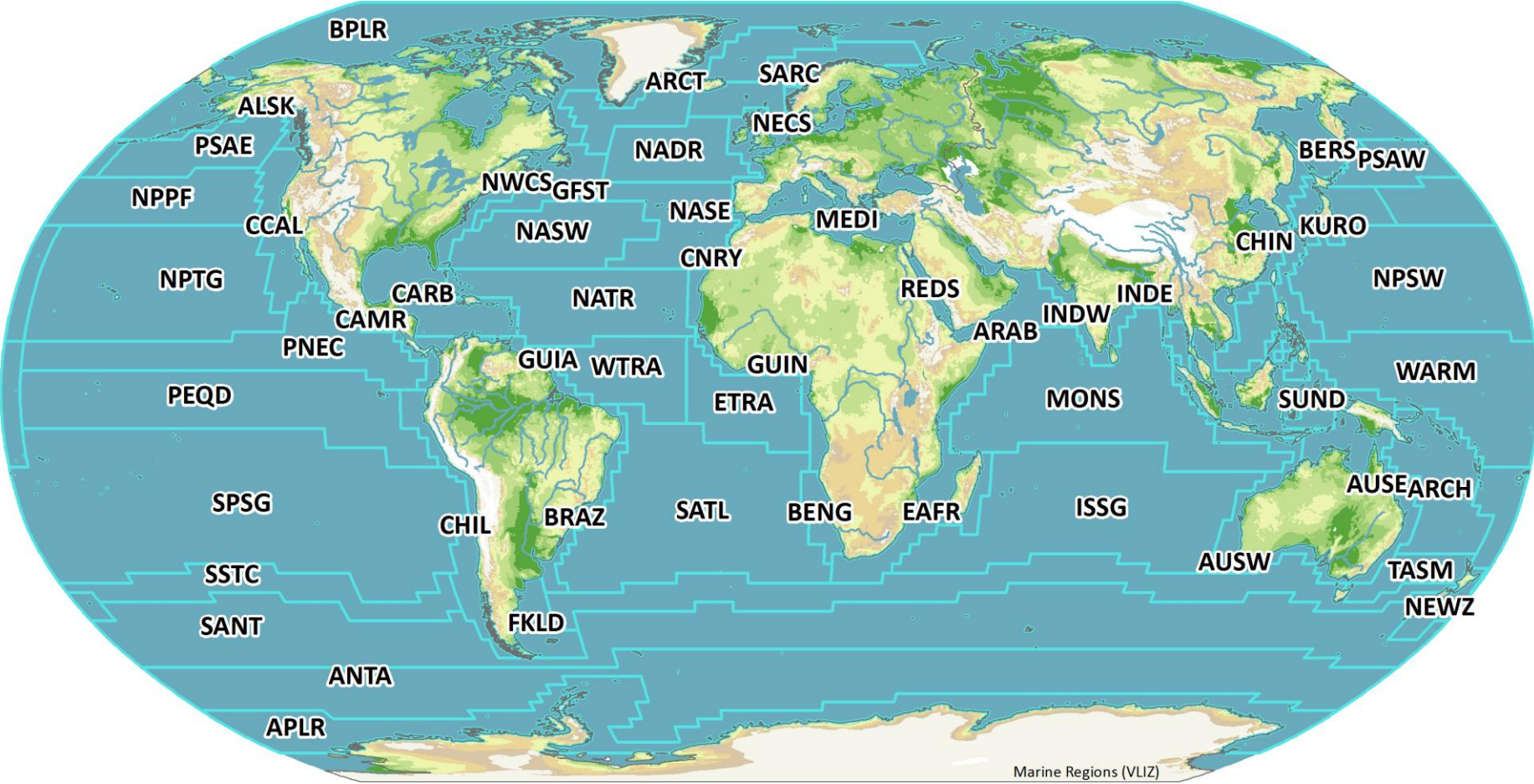
- The **bio-Argo float** : improve biological monitoring (400-500)
- The **Carbon-float** : phenomenological/process studies (20-40)
- The **Val-float** : to support EO-ocean colour validation (20-40)

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



Still, OC and BioArgo are needed for bio-regionalisation

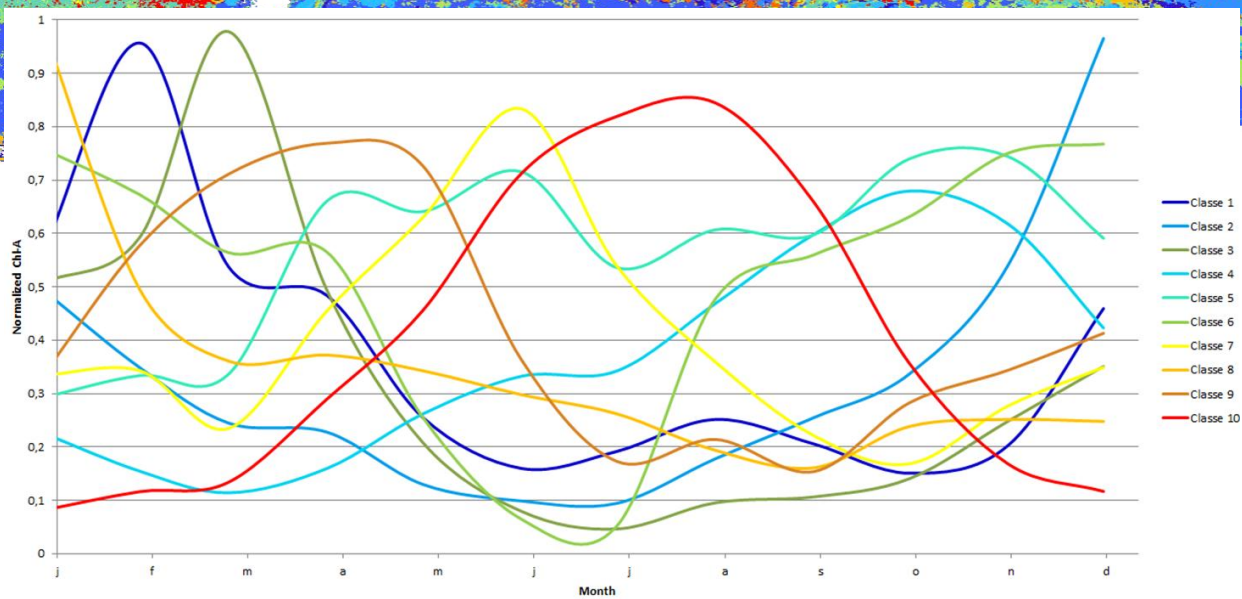
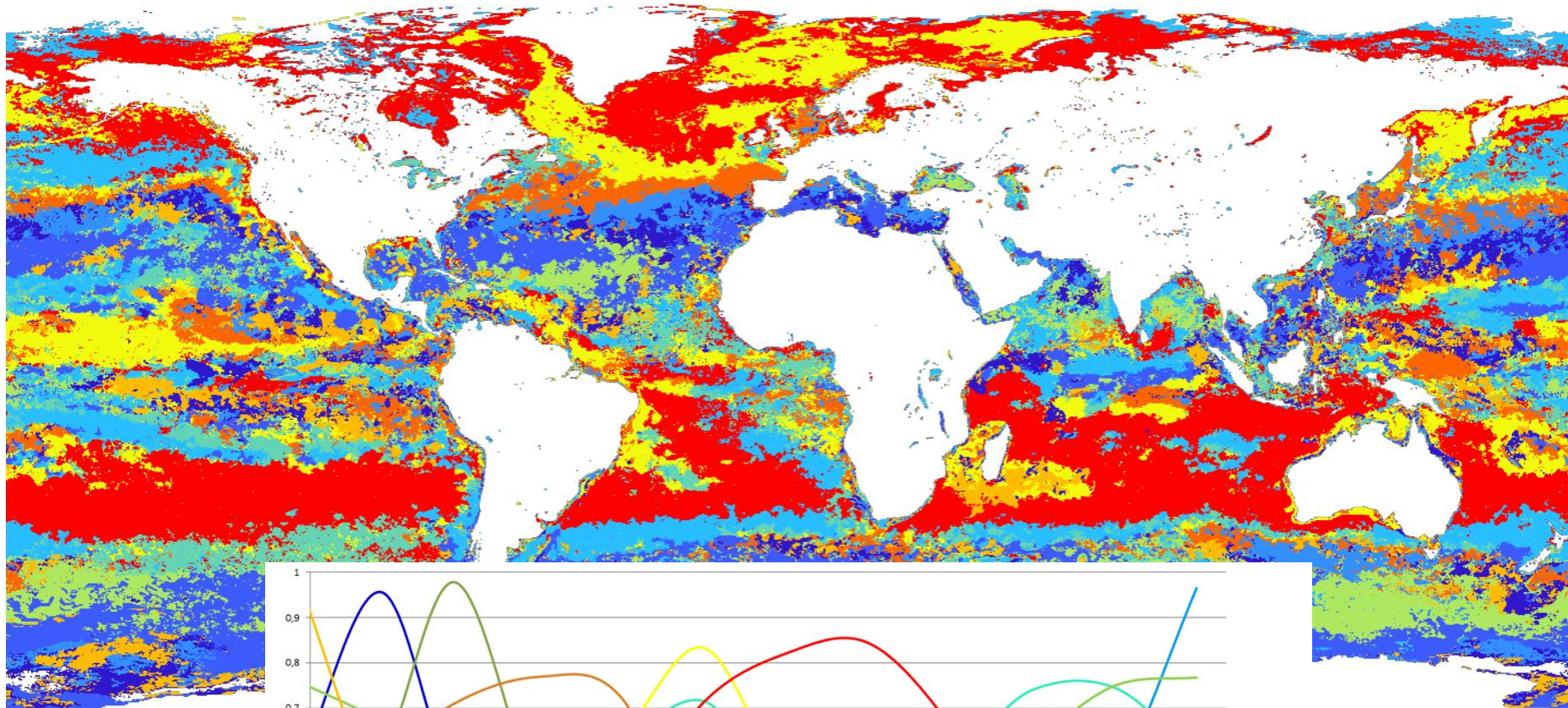




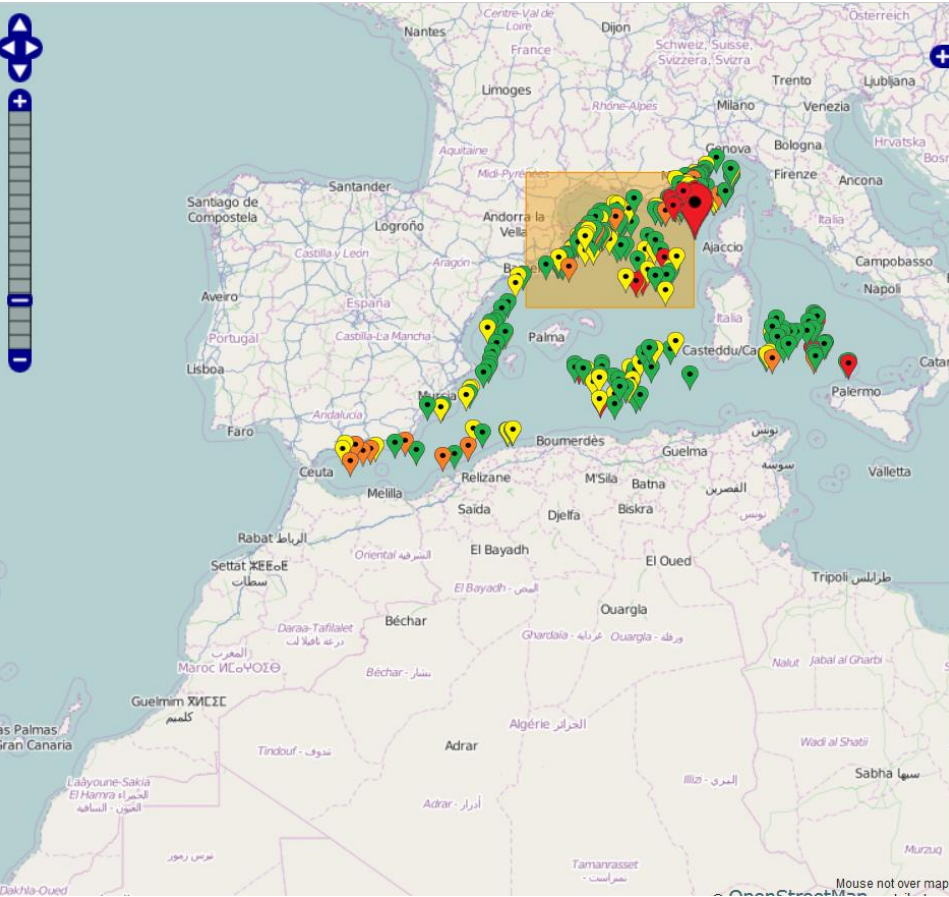
More than 50 bio-regions

# Bio-regions / classification of Chla time series / 10 classes

(Same approach as D'Ortenzio et al., 2009)

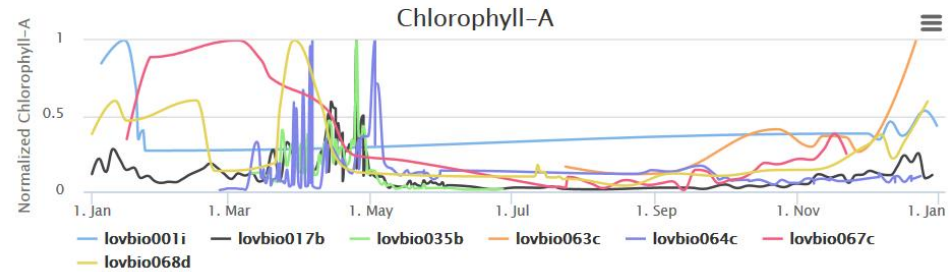
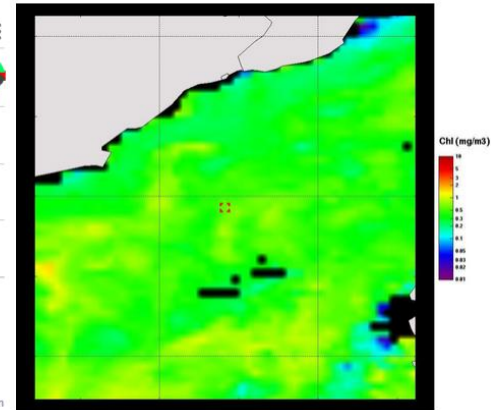
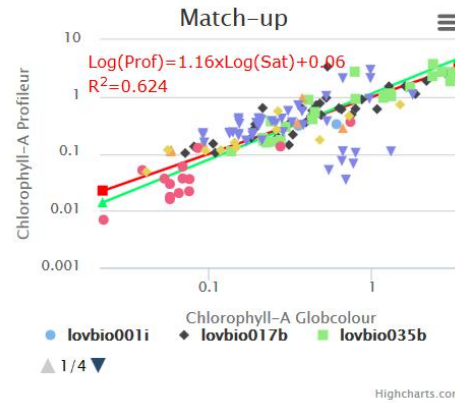


# Seasiderendezvous.eu/mapmatchup

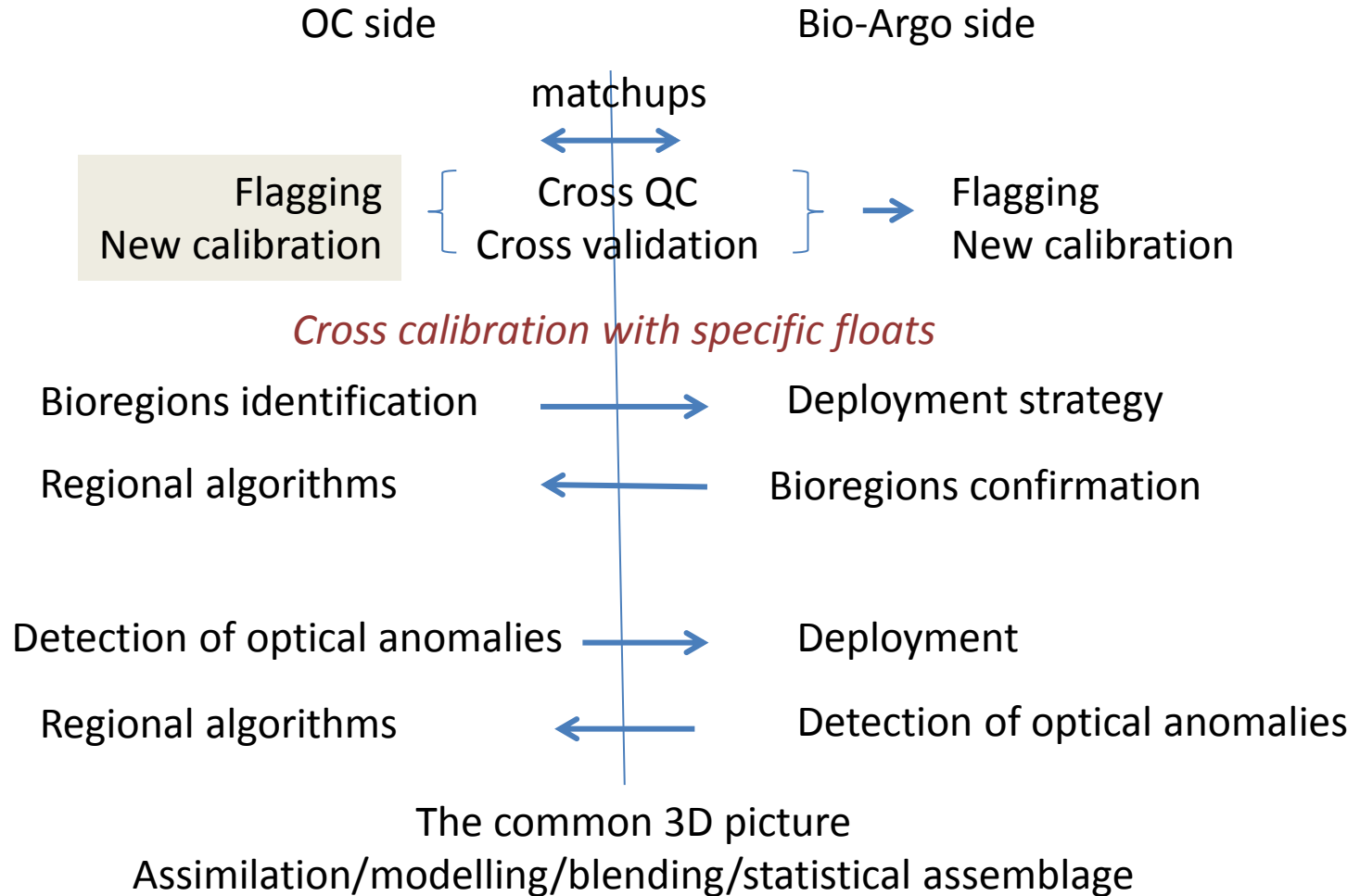


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# OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour



# OPPORTUNITIES for Joint Use of Bio-Argo and Ocean Colour

