# Brief Introduction

From the IOCCG report to an emerging Bio-Argo program

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The Argo program
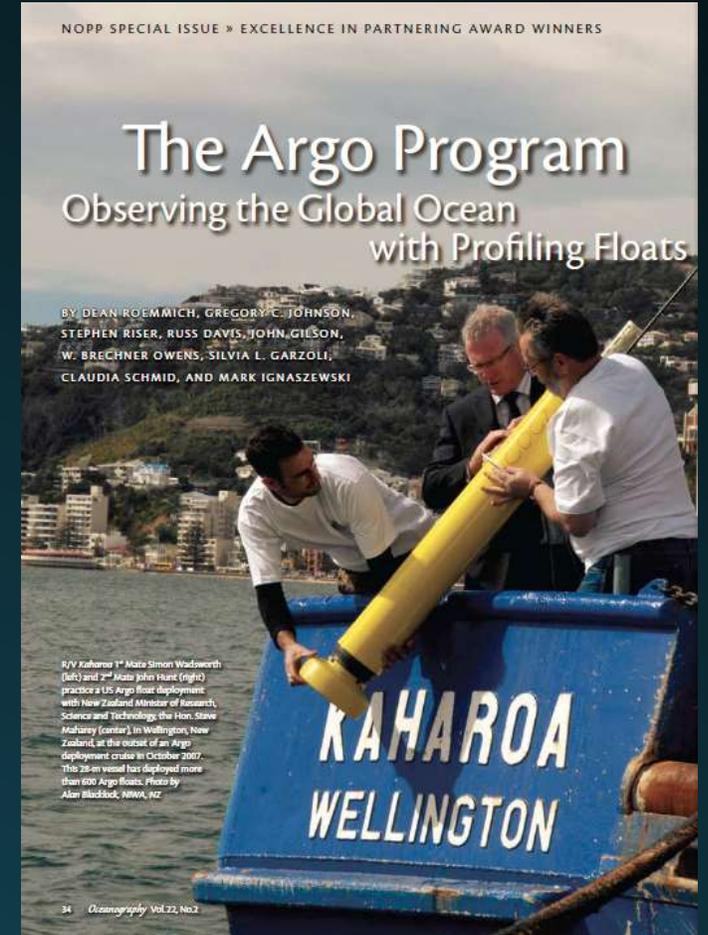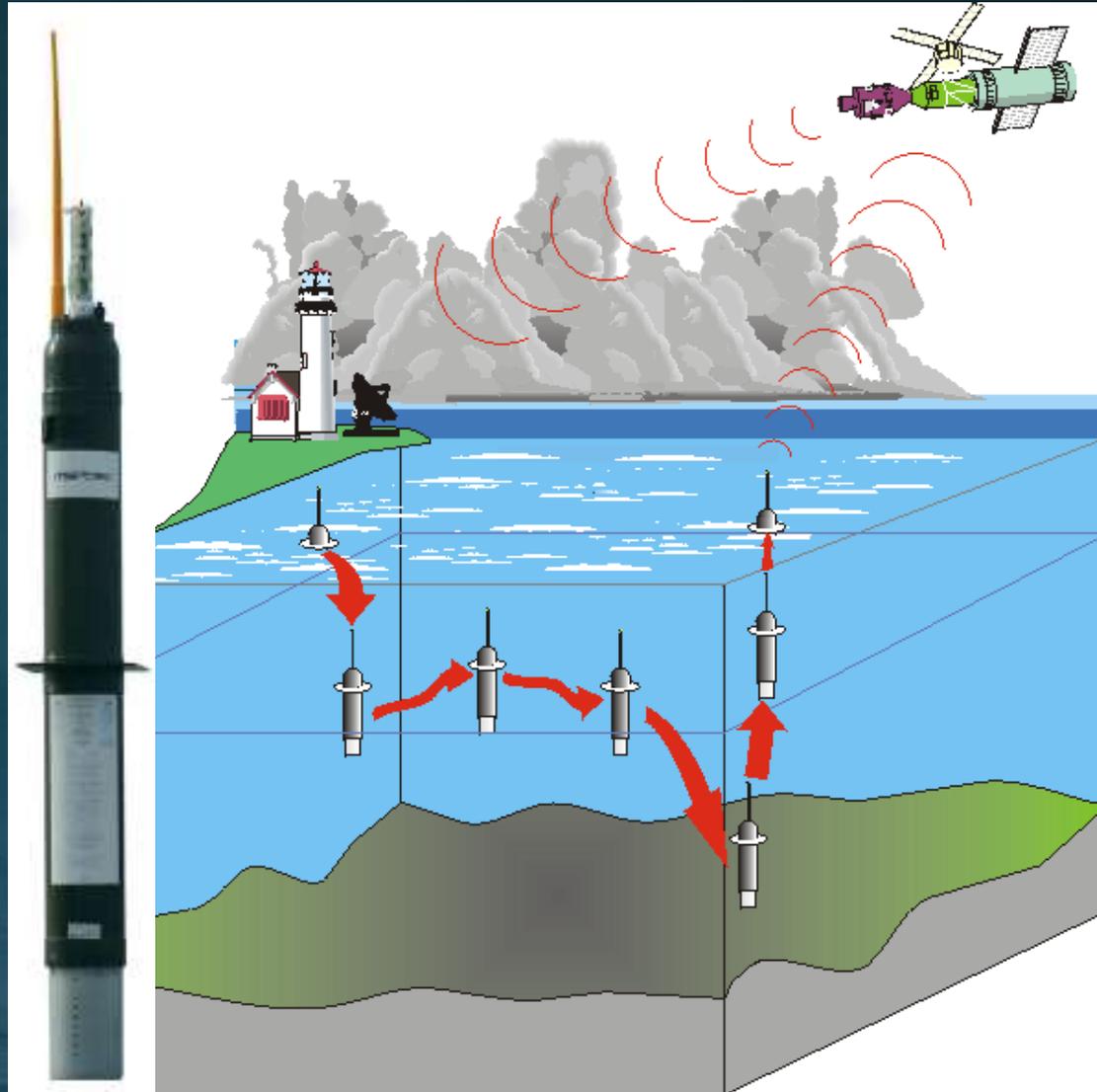
The Argo program
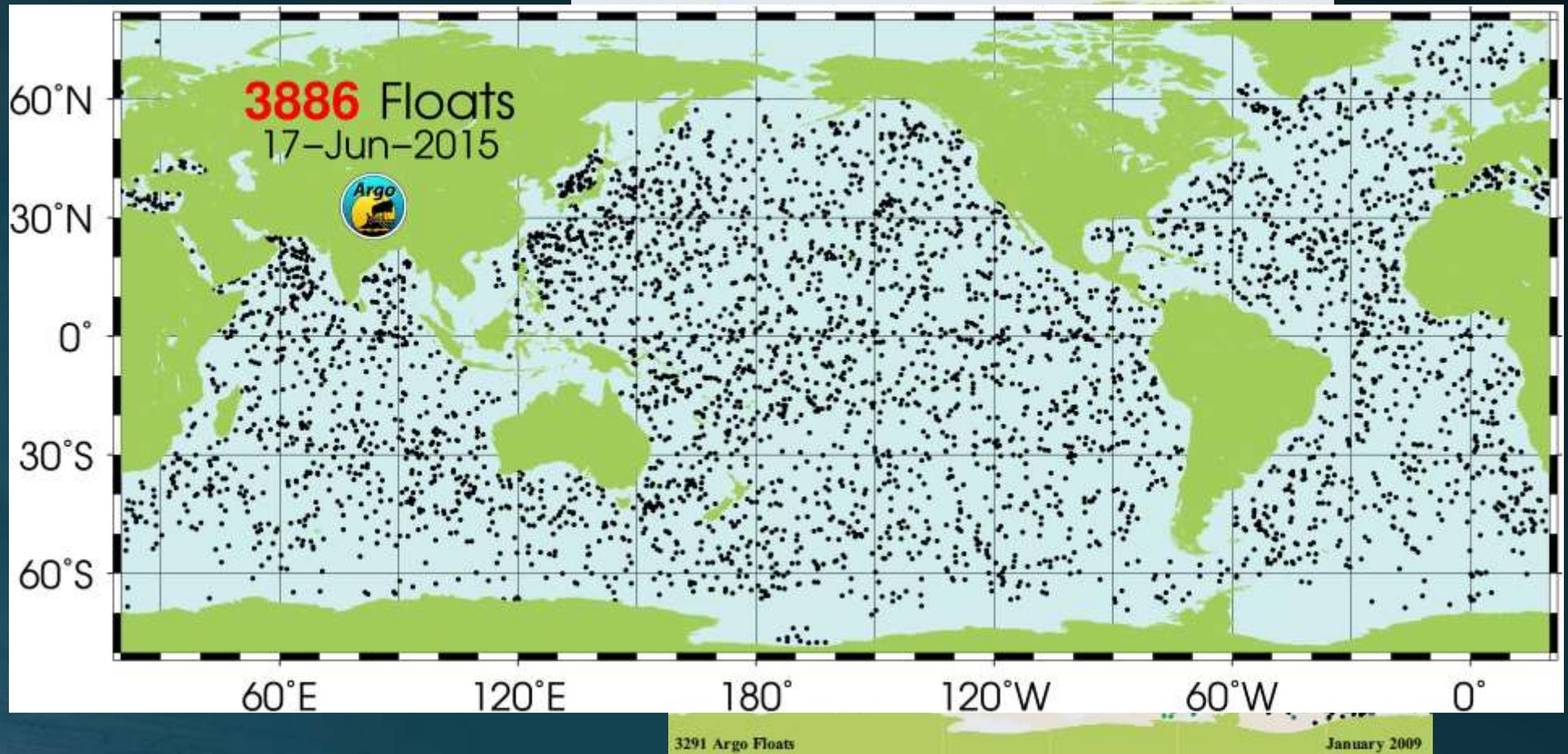
(Roemmich et al., Oceanography, 2009)

The Argo program

1 000 000 - One million Argo floats profiles reached on 31/10/2012
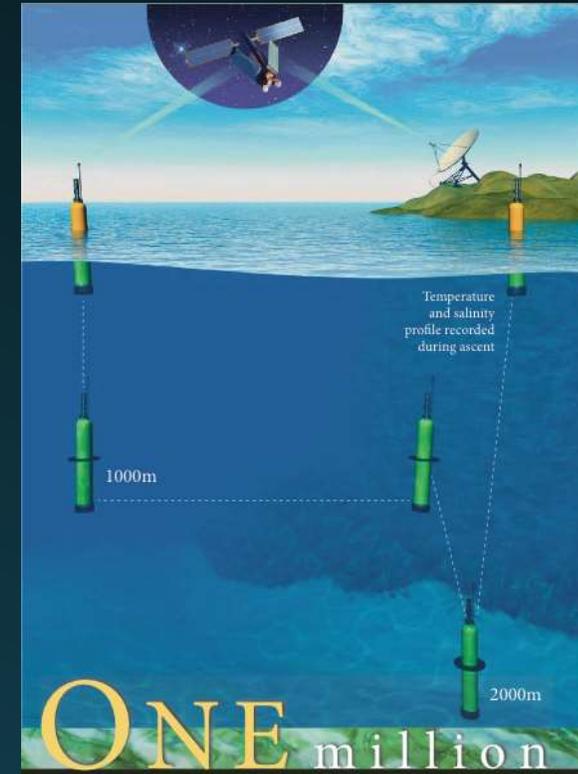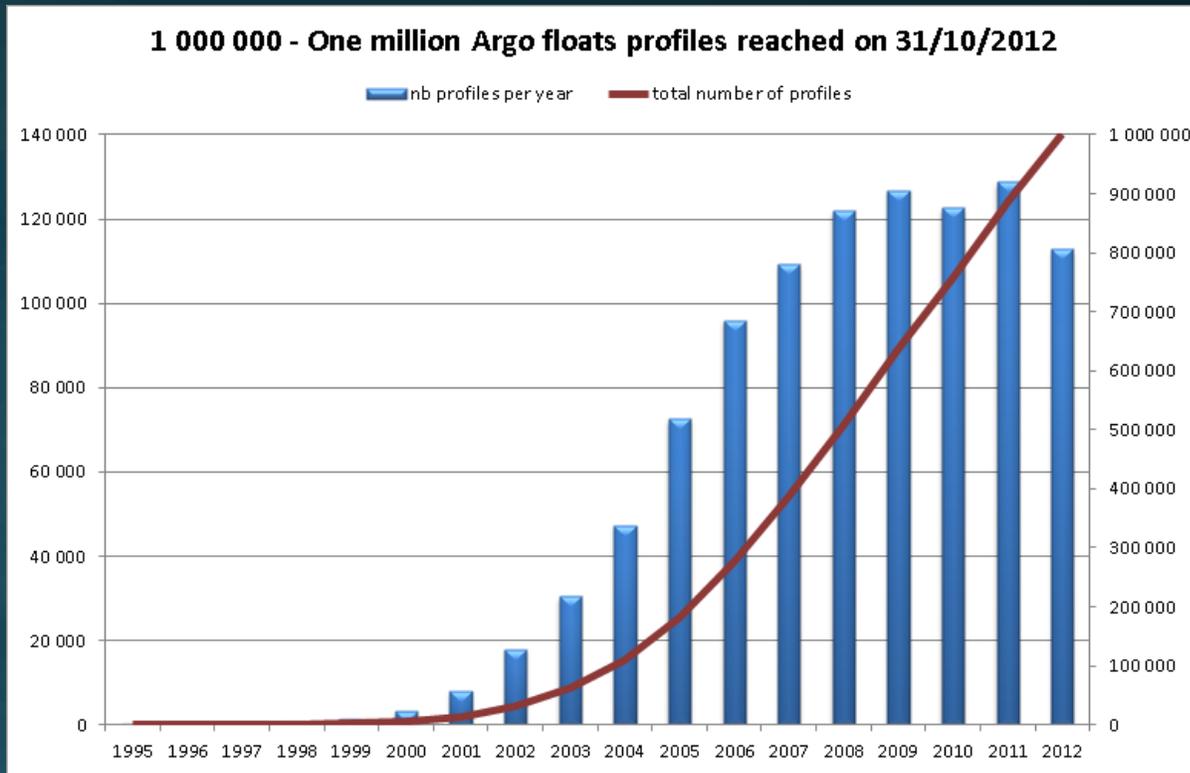
- More than 98 % of T&S profiles are acquired by Argo floats.
- The Argo program is highly cost-effctive compared to the ship-based observation.

From Argo to Bio-Argo (BGC-Argo)
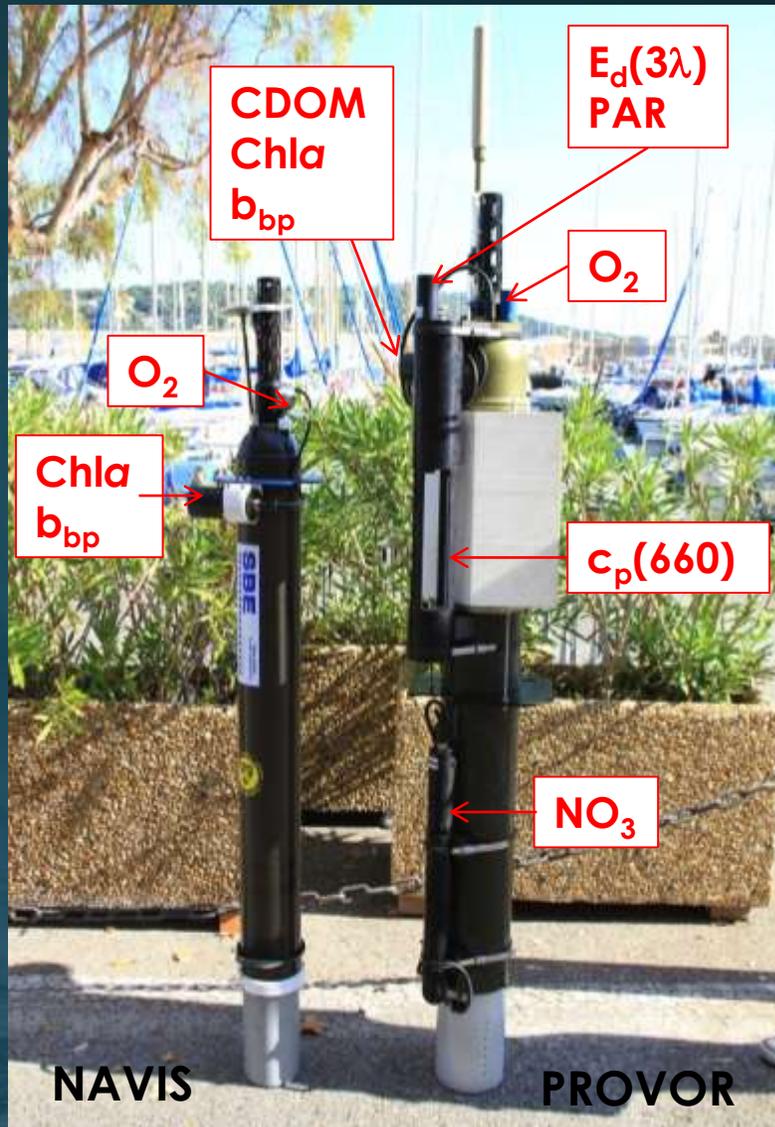
From Argo to Bio-Argo (VAL-Argo)

$E_d(\lambda)$

O_2

$c_p(660)$

CDOM
$b_{bp}(\lambda)$
$b_{bp}(\lambda)$

Chla
$b_{bp}(700)$
$b_{bp}(\lambda)$

$L_u(\lambda)$

APEX

$E_d(7\lambda)$
$L_u(7\lambda)$

$E_d(7\lambda)$
$L_u(7\lambda)$

PROVAL
(PROVOR)
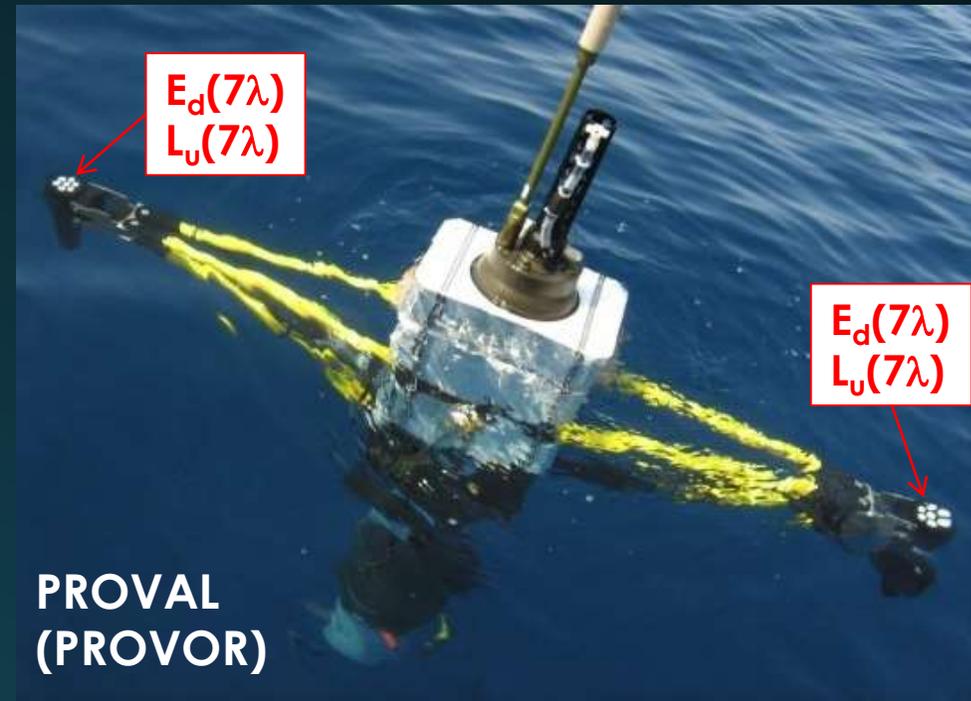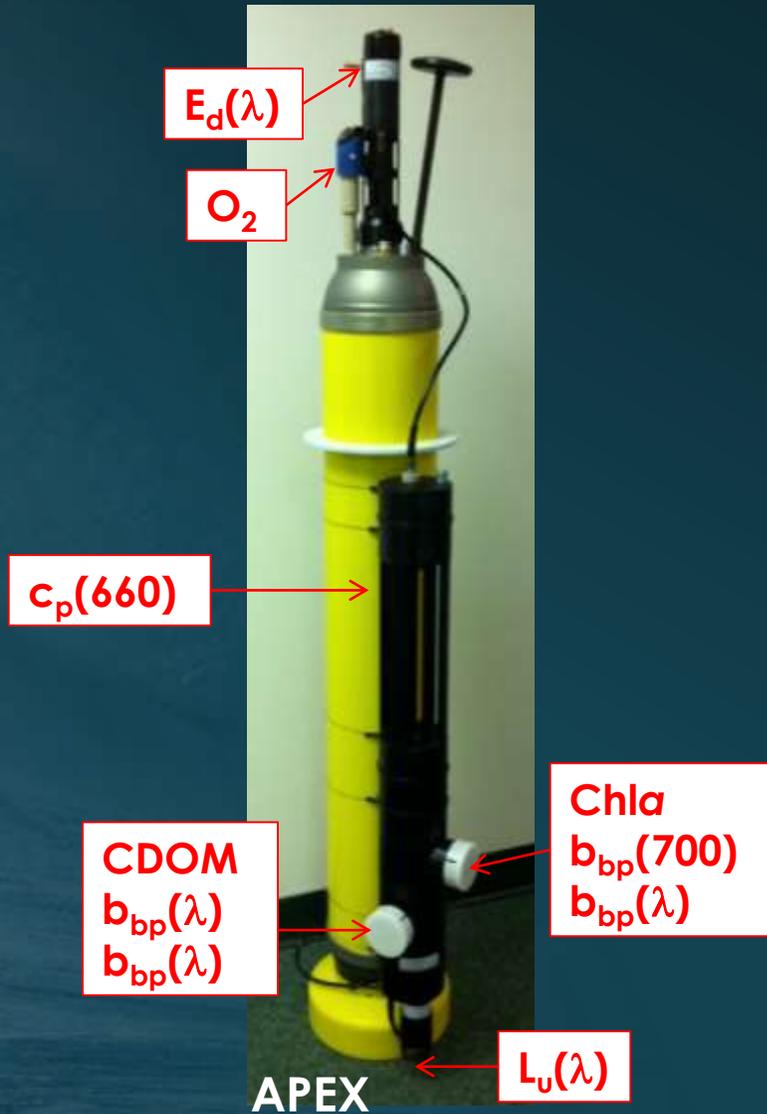
IOCCG Report 11

- Bio-Argo represents a very promising avenue for synergetic applications with remote sensing of ocean color.

  - **Calibration and Validation of OCR products**
    VAL-Argo & hyperspectral floats

  - **Refining bio-optical algorithms**
    Regional/seasonal variations of
    bio-optical relationships.

  - **Data complementation to OCR**
    High Vertically and temporally resolved
    Cloudy/low-light regions

Bio-Optical Sensors on
Argo Floats

Reports of the
International Ocean-Colour
Coordinating Group

REPORT NUMBER 11

CCG
An Affiliated Program of SCOR
An Associate Member of CEOS
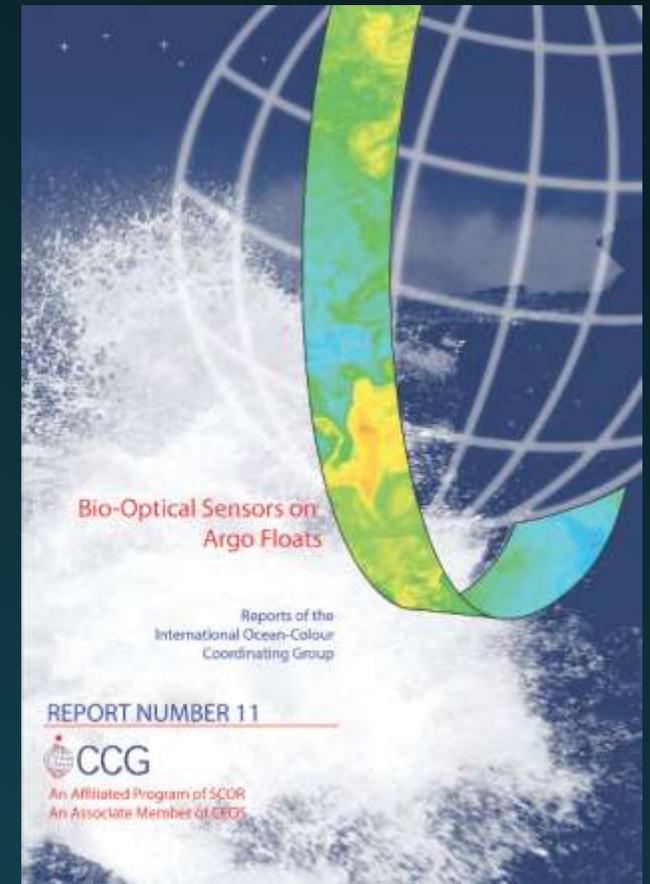
Conference Summary:

The Argo array is transforming our knowledge of the upper ocean density field and its variability, and its data streams are being **used in many scientific and forecasting applications. The network should be maintained.**

There was great interest at the conference in **increasing the number of variables measured from profiling floats. A strategy for the next generation of observation via profiling floats should be developed**, and aim to meet a wider variety of scientific and societal goals.

BIO-OPTICAL PROFILING FLOATS AS NEW OBSERVATIONAL TOOLS FOR BIOGEOCHEMICAL AND ECOSYSTEM STUDIES: POTENTIAL SYNERGIES WITH OCEAN COLOR REMOTE SENSING.

Hervé Claustre[1], Jim Bishop[2], Emmanuel Boss[3], Stewart Bernard[4], Jean-François Berthon[5], Christine Coatanoan[6], Ken Johnson[7] Aneesh Lotiker[8], Osvaldo Ulloa[9], Marie Jane Perry[10], Fabrizio D'Ortenzio[1], Odile Hembise Fanton D'andon[11], Julia Uitz[12]

Community white paper Published in 2011

An emerging Bio-Argo program

- Vigorous community

- Rapid increase of deployments of Bio-Argo float as part of individual projects in key biogeochemical "hotspots".

- Critical: developing Bio-Argo data management in tight connection with Argo to guarantee that data reach to end-user in RT as well as in DM.

Vigorous Community

✓ **Ocean Sciences Meeting**
(*2012, Salt Lake City; 2014, Hawaii; 2016, New Orleans*)
Session 085: Towards a Global Ocean Biogeochemical Observing System Based on Profiling Floats and Gliders

✓ **SCOR WorkGroup 142**
(*2014, Hawaii; 2015, Brest*)
Quality control procedures for oxygen and other biogeochemical sensors on floats and gliders

✓ **Bio-Argo workshop in Argo-ADMT annual meeting**
(*2012, Hyderabad; 2013, Liverpool; 2014, Ottawa; 2015, Bermuda*)
Data format, store and processing of Bio-Argo floats in Argo dataset

✓ **International Ocean Colour Science Meeting**
(*2015, San Francisco*)
Joint use of Bio-Argo and ocean colour

# 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

Fast-increasing floats

Bio-Argo (277)

Dissolved Oxygen (262) Bio-optics (92)

Nitrate (61) pH (14)

April 2015

jCOMMOPS

http://www.oao.obs-vlfr.fr/maps/en/
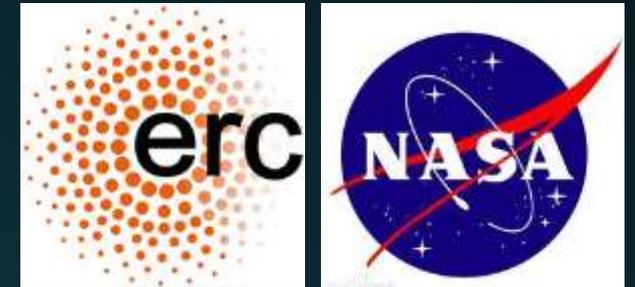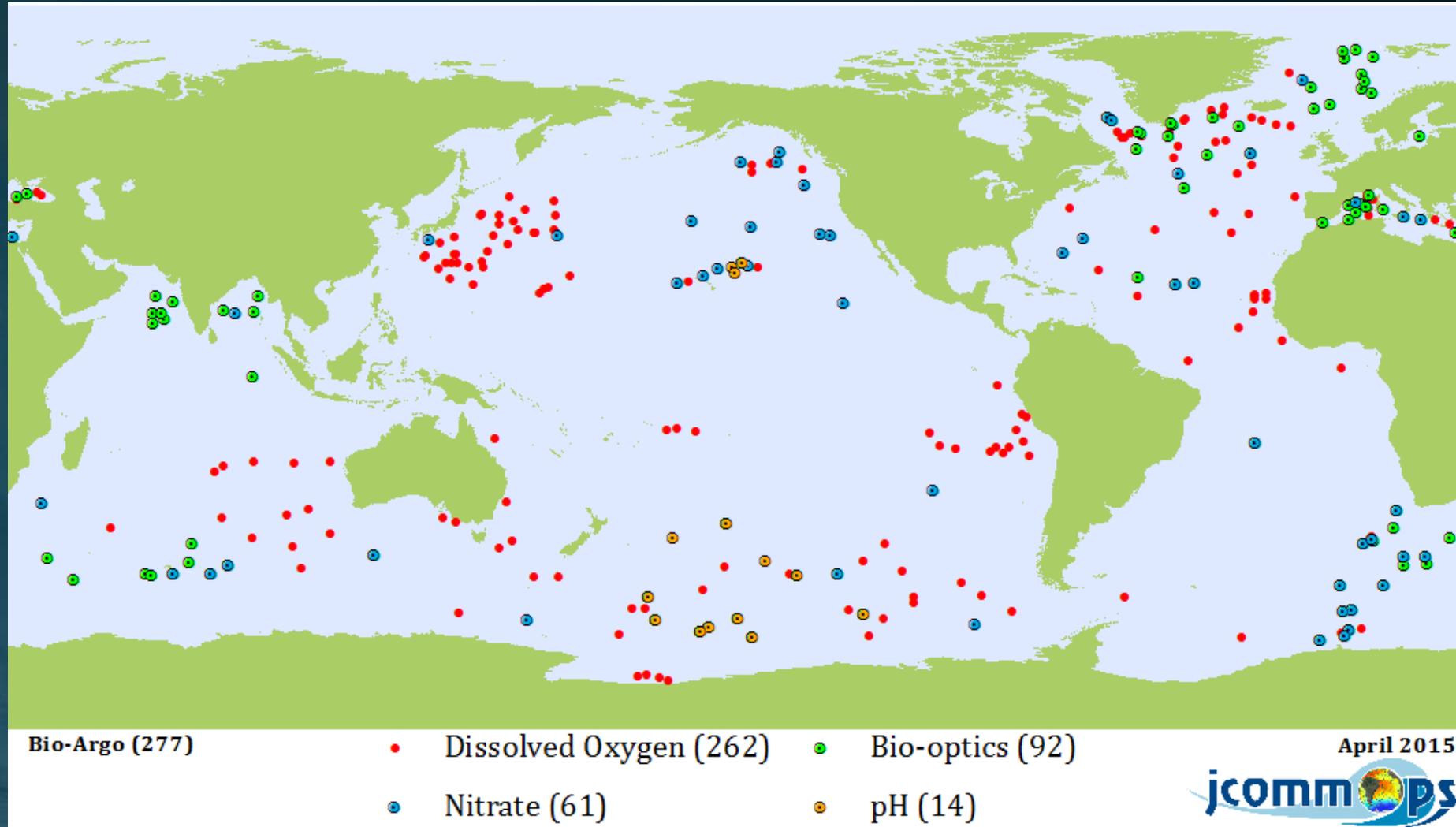
The future of Bio-Argo program

- Until now, Bio-Argo has essentially focused on key biogeochemical hotspots in specific areas. The supporting programs of these "early" deployment are considered as successful prototypes of a dense Bio-Argo network.

- Therefore recent discussions within the Argo program have lead to the conclusion that it is timely to elaborate a science and implementation Bio-Argo plan for the global scale.

- The interested communities will be soon solicited and the OCR community will have to play a key role in this elaboration.

- The implementation will obviously not, like the Argo program, rely on the deployment 3500 floats "regularly" spaced.

- Rather alternative methods will have to be developed to size the array to respond in a cost-effective way to the scientific question. OCR remote sensing will have a key tool to size it.

Thanks for your attention!