

Towards Optics-Based Measurements in Ocean Observatories -

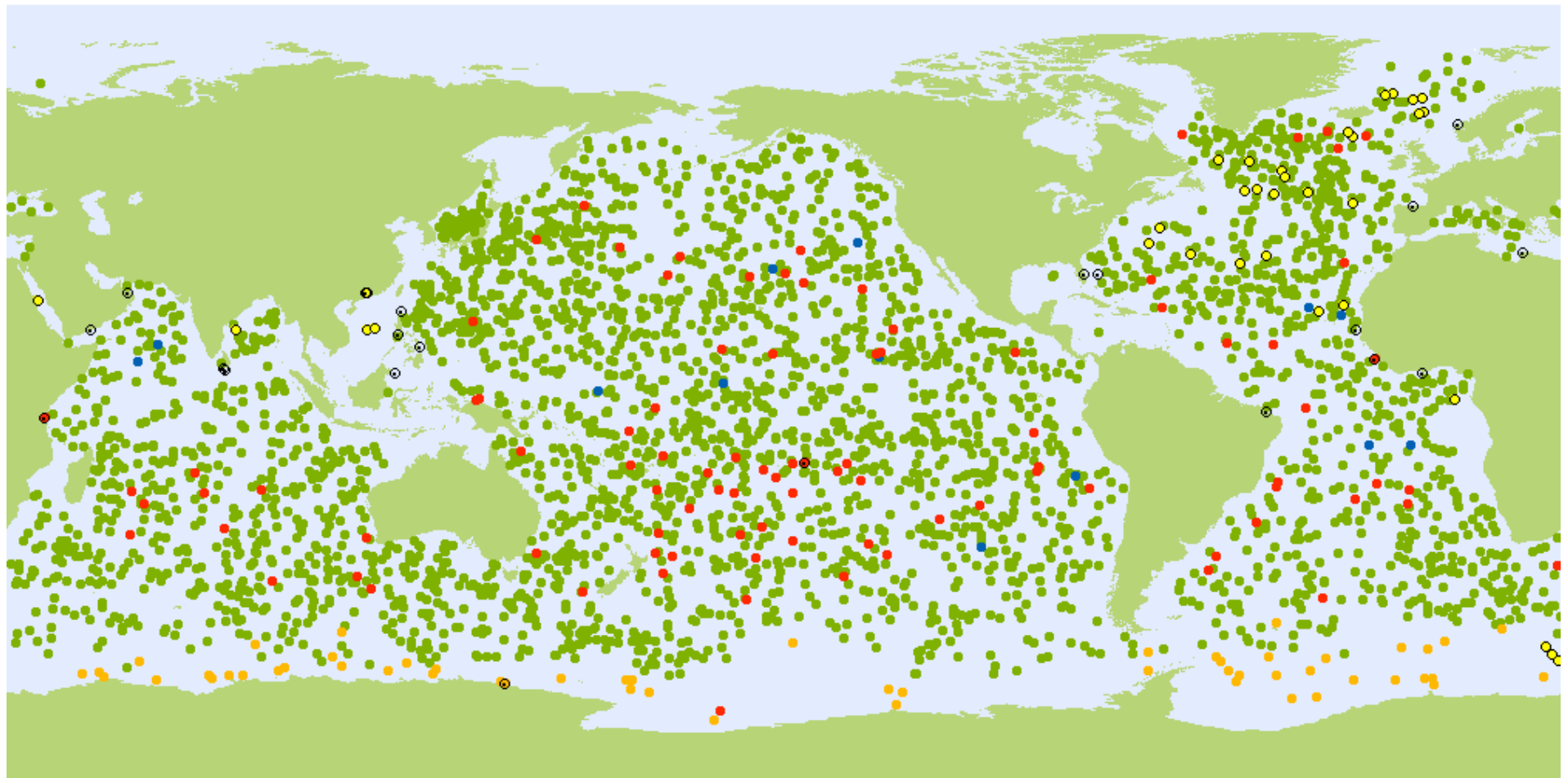
The Argo program

E. Boss (H. Claustre, K. Johnson)

- What is Argo?
- Optical measurements on profiling floats.
- Integration of optical sensing into Argo.



The Argo array



3561 Active Floats

- ◉ Beached Floats (22)
- Flagged -Altimetry QC (17)
- No Data (33)
- Grey List(94)
- IcedOver (56)
- "Operational" (3291)

July 2012

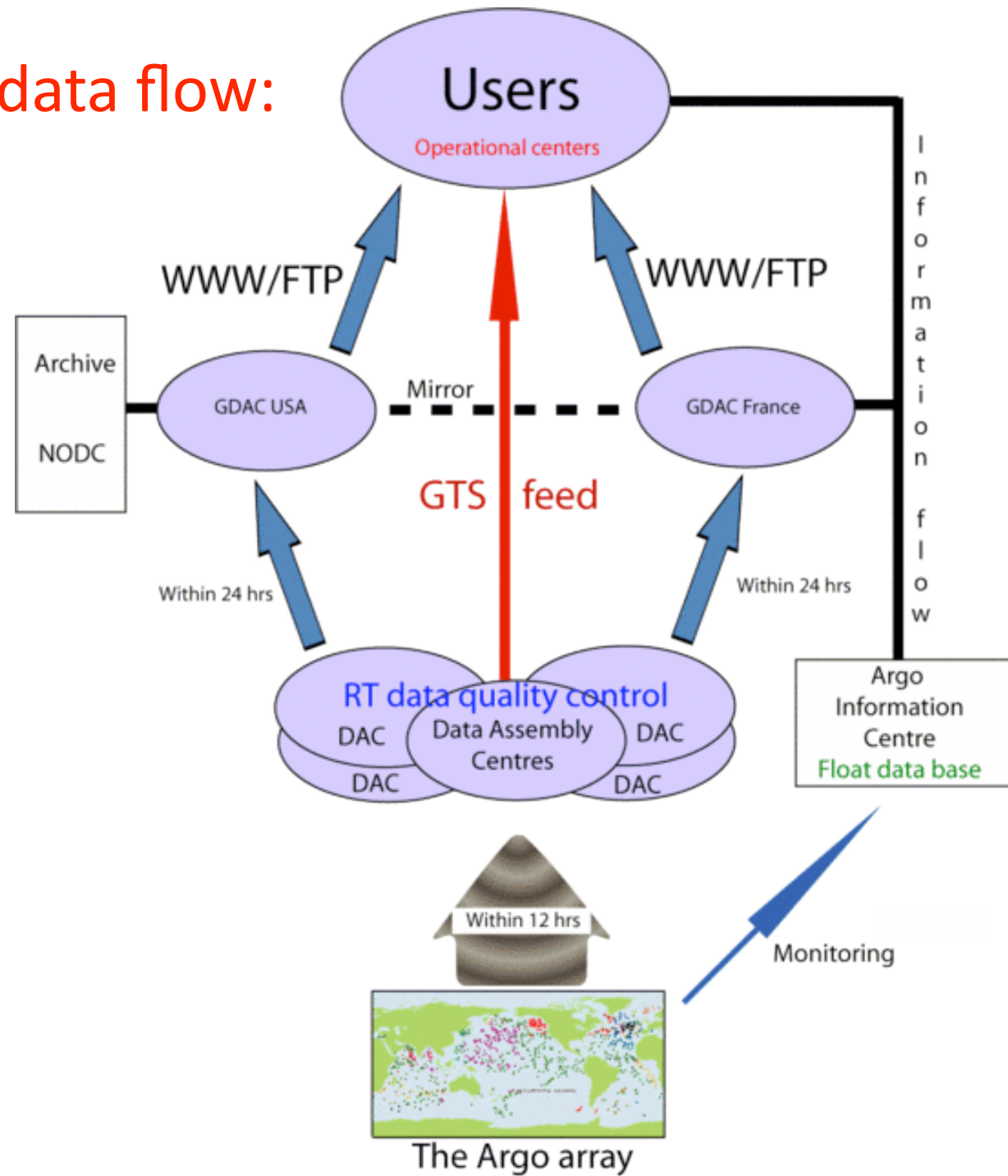


On average, a profile from 2000m every 10days

The Argo Observing System

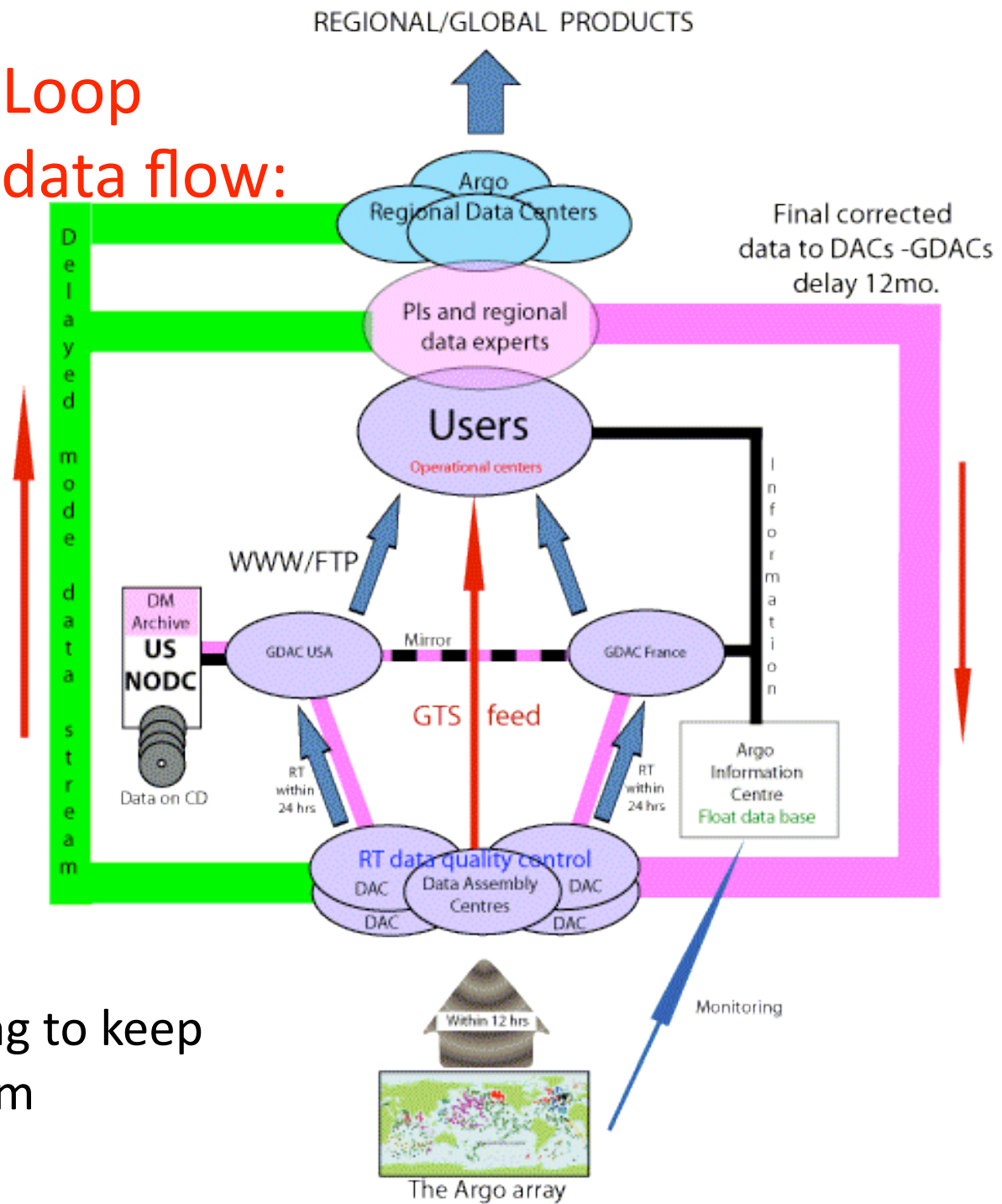
- Made entirely of profiling floats (relatively homogeneous technology).
- Global in scope and in participation
- Climate focus (GODAE, CLIVAR, GOOS)
- Real-time and delayed mode QC
- Nearly 1,000,000 profiles to date!

Automated data flow:



Human-In-The-Loop

Delayed-mode data flow:



Yearly ADMT meeting to keep improving this system

The Argo Observing System

- Relatively cheap (~\$100 per profile)
- Sustained (measurements where and when we cannot be there).
- Limited in power, real-estate and bandwidth (improving all the time).
- Little control where platform drifts to (improving via modeling/assimilation).

Optics on profiling floats

Greg Mitchell – radiometer observing the spring bloom in the Sea of Japan

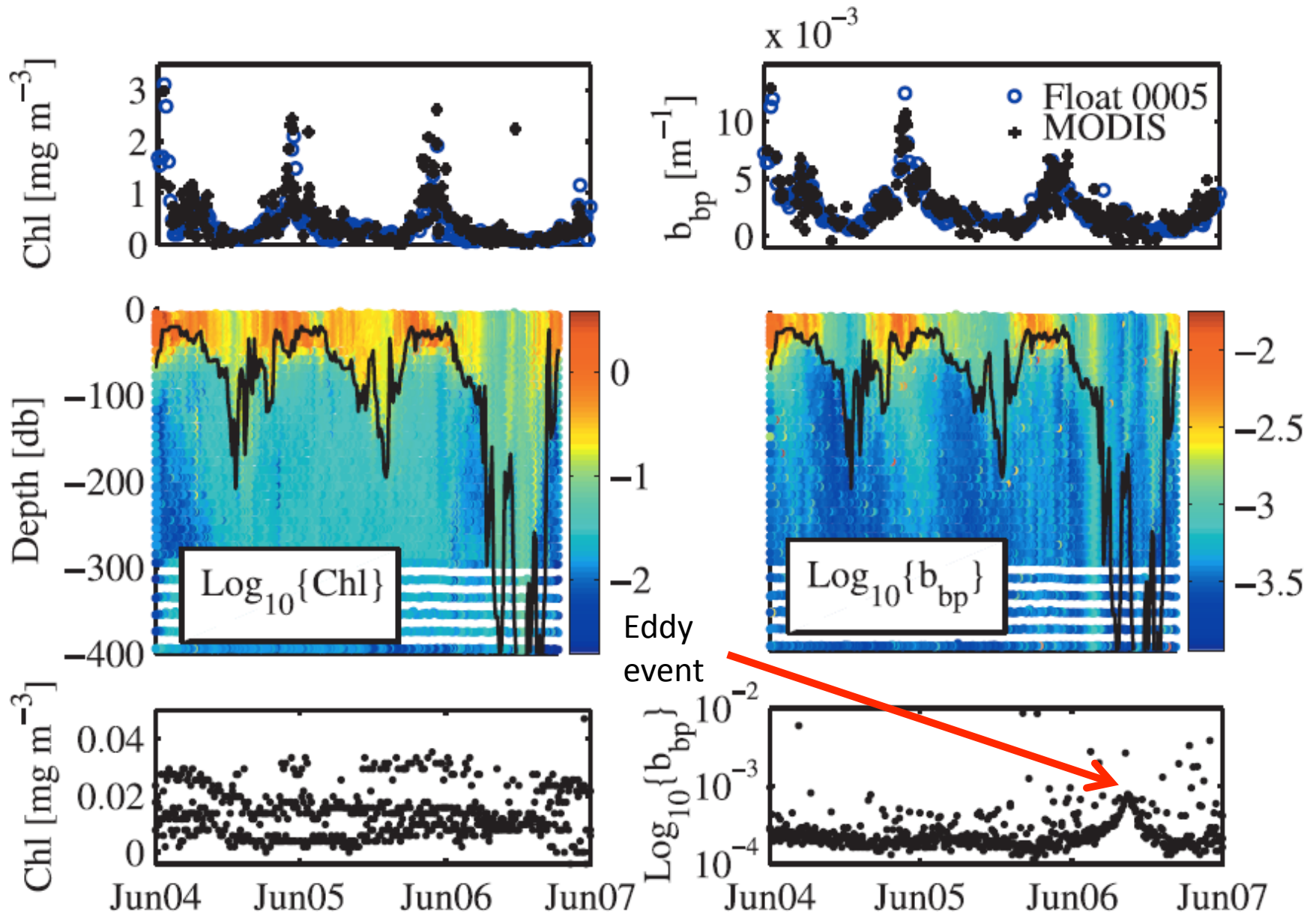
Bishop – Observation of dust iron fertilization and artificial iron fertilization. Carbon explorer. PIC-sensor.

Claustre – using transmissometry to compute growth rate using 3 day-time profiles

Boss – 3yrs of sustained observations. Challenging the Sverdrup model of the spring bloom in the NA.

Boss – Testing the use of profiling floats as vicarious calibration platform (poster @OO2012)

3 years of data



A vision for the future: the Riley (or NPZ) float

N: ISUS

P: F_chl, bb or beam-c

Z: LOPC/Gorsky/novel cheap acoustic b_b

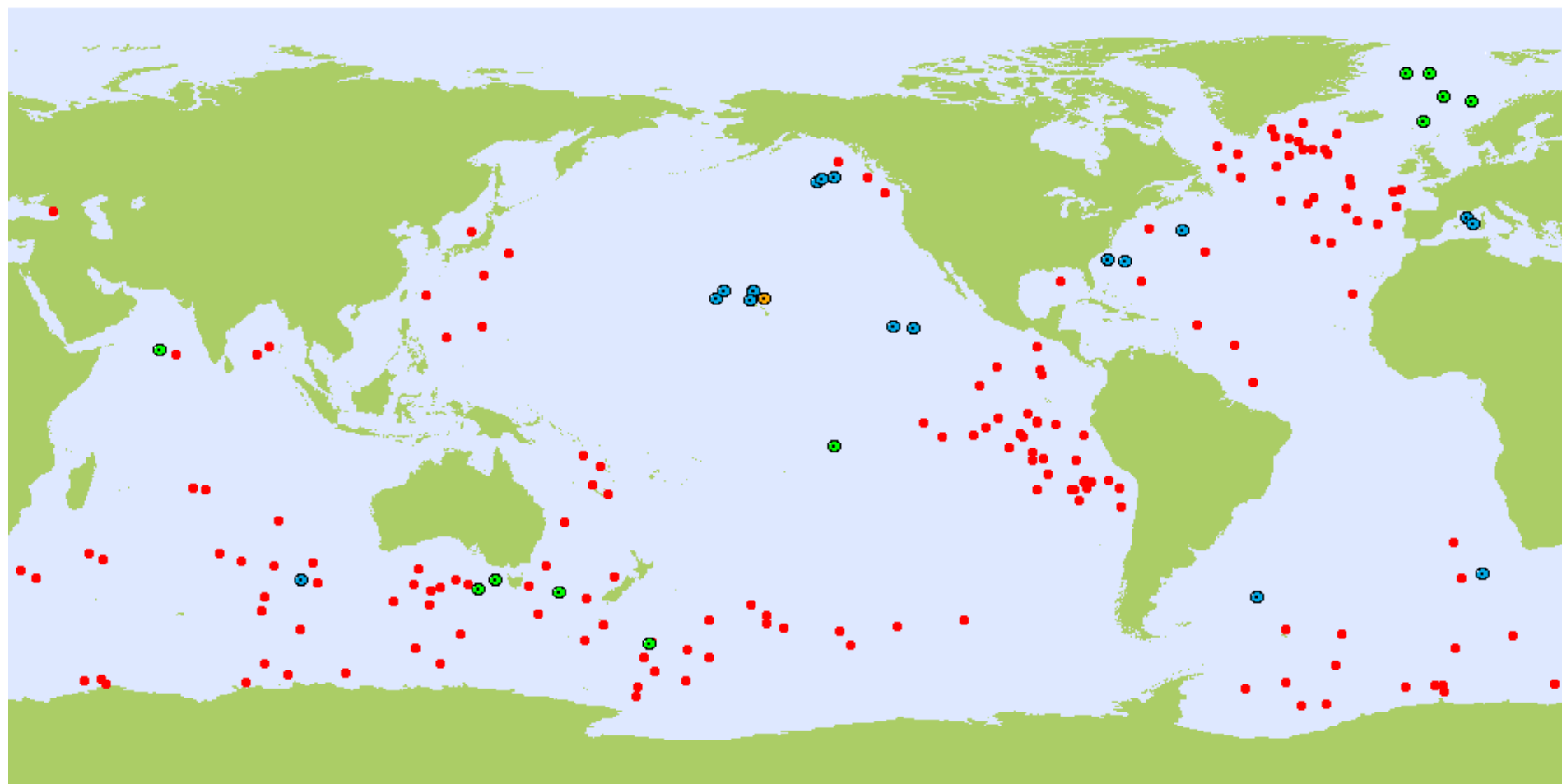
+PAR & O_2

Minimum sensor-suite to constrain ecosystem models.

Our vision is often constrained to be 'bottom-up' by the lack of cheap zooplankton sensors.



Optics (and BGC) on Argo

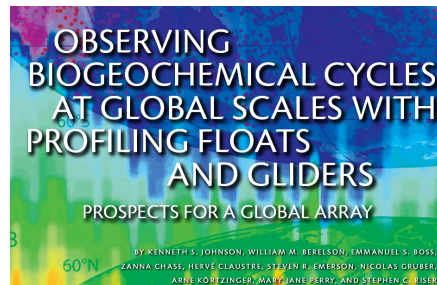


BIO Argo

- Dissolved Oxygen (190)
- Bio-optics (12)
- Nitrate (18)
- pH (1)

July 2012

The Bio-Argo community is getting organized:



Oceanography (2009)



Toward the Implementation of a Global
Autonomous Biogeochemical Observing System.
WHOI, July 19, 2011

[Link with Euro-Argo highly welcomed](#)



Reports and Monographs of the International Ocean-Colour Coordinating Group

An Affiliated Program of the Scientific Committee on Oceanic Research (SCOR)
An Associated Member of the Committee on Earth Observation Satellites (CEOS)

[IOCCG Report Number 11, 2011](#)

Bio-Optical Sensors on Argo Floats

Edited by:

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Report of an IOCCG working group on Bio-optical Sensors on Argo Floats, chaired by Hervé Claustre, and based on contributions from (in alphabetical order):

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« Bio-Argo » Community White Paper

« Bio-platform in open Ocean » Plenary Paper

Bio-optics on Argo – where are we today:

Invited to ADMT-12 to build the Real-time QC framework for F_chl, bb and Nitrate.

Euro-Argo: 20% of floats with BGC sensors.

US: regional projects in planning stage.

Some limiting factors:

1. Cost of sensors.
2. Sensitivity of sensors.
3. Trained personnel at DACs