Hardware: good practices for good data
-> on 70 bio-floats
① Introduction

② What we did as “good practices” for 70 bio floats
   a. Training
   b. Sensor testing
   c. Floats/sensor testing
   d. Predeployment
   e. Deployment
   f. Post-deployment

③ Feedback for the 70 floats
   a. On deployment
   b. On data

④ Conclusion: What’s next?
Elaborate “good practices” recommendations with respect to float and sensor preparation, calibration, deployments and associated in situ simultaneous measurements.

Bio-Argo task team

➢ since 2012 we deployed 70 bio-floats with the same procedure
- RUDICS communication
- Double board
- Up to 10 profiles per cycle
- 5 resolution zones per sensors

➢ customizable mission -> more than 500 parameters

Iridium – gps antenna
CTD sensor
Oxygen sensor
3 bio-optical sensors
Nitrate sensor
Buoyancy Foam
Magnet Position (ON/OFF)
Magnet Position (Bluetooth)
Tracability Label (Float @ BT, Rudics Login)
② What we did as “good practices”

a. training

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Total floats deployed</th>
<th>bio-man</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>E-AIMS</td>
<td>6</td>
<td>3</td>
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<tr>
<td>Europe</td>
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<td>UK Bio Argo</td>
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<td>Italy Bio Argo</td>
<td>7</td>
<td>2</td>
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<tr>
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<td>NAOS</td>
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<td>4</td>
</tr>
<tr>
<td>France</td>
<td>GMMC</td>
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</tbody>
</table>

- The same procedure was used by 6 different projects
- train 23 persons for “good practices”
What we did as “good practices”

a. training

- 1 person was trained by email and phone
- 4 persons were trained in the dock before deployment
- 10 persons were trained in our laboratory
- 8 persons were trained during the 1st BIO-ARGO FLOAT WORKSHOP
  From pre deployment to validated data.
  June 2014, Villefranche/Mer

- 2nd BIO-ARGO FLOAT WORKSHOP
  In June 2015 in Villefranche/Mer, France
Systematic controls of the bio-optics sensors were conducted since 2012

System of Inter-calibration of Bio-Optic sensors (SIBO)
- Logger up to 14 sensors (e.g., 6 chl_a sensors + 6 radiometer sensors + 2 SUNA)
- 0 - 200 meters profiles

SIBO is a useful tool to control in real life the sensors
Here the result:

- 141 CHLA sensors were set up on a the SIBO associate with a “gold/master” sensor.
  - 4 had error on the calibration coefficients
  - 1 didn’t work

- 32 nitrate sensors were tested.
  - 2 didn’t work
  - 12 were badly configured

- a simple control on your sensors to avoid bad news on your data
Tests conducted in pool (Ifremer, Brest, France)

- 32 days missions in Brest
  - 106 floats deployed in the pool
  - 600 profiles (0-30m)

One of the issue of the sensors is to define correctly the dark value of the calibration equation. 76 different chl_a sensors with black measurements (black tape on sensors)

If oxygen sensors are set on the float, the sensor can be controlled
What we did as “good practices”

c. Floats/sensor testing

Float profiles in Ifremer Brest pool
-> specific ruddics login for the test
② What we did as “good practices”

c. Floats/sensor testing

WMO 6901510
c. Floats/sensor testing

These predeployment tests are useful in order to have an idea of the relevance of the manufacturer calibration compared to in situ conditions and to check whether the float and sensors are ready to be deployed.

« Bio-Argo: qualification of sensors and evaluation of their factory calibrations. »
Euro Argo, 2013 Southampton, UK.
② What we did as “good practices”

http://www.oao.obs-vlfr.fr/DEPLOYMENT/Home.php

Before Deployment
- Gather information
- AIC Notification
- Get the MAL Sheet

Deployment
- At Launch configuration
- Deployment procedure

After Deployment
- Fill and Send MAL File
- Register For News
- Change Configuration

General Rationale

In the framework of Bio-Argo European Activity, LOV is in charge to support Bio-Argo users, by working on the sensors (before mounted on the fleet) and on the data treatment (after the deployment). For these phases LOV will treat Users floats exactly as LOV floats are treated.
Gather information

for the 70 floats deployed since 2012

- serial number of the board
- serial number of the float
- sensors information
- manufacturer calibration equation

- strong interaction with the PI of the float

- all these data must be stored in the metadata.nc file
AIC Notification

all the 70 floats deployed since 2012 were notified on the AIC website (under 5 program: E-AIMS, NAOS, CORIOLIS, remOcean, Argo Italia)

Get the MAL (MALO) sheet

few month ago we start to use a new standard xlsx sheet set up by Coriolis

- all 70 floats in the data base
- new MAL sheet
What we did as “good practices”

e. deployment

Since the 1st deployment in 2012 we sent the float with the same standard 1st profile:

- Profile 0 to 1000m
- Surface every day at 12 GMT
- Drift at 1000m
- Ex: 4 zones for chlorophyll_a ascent AND descent
  - 0 – 10m : 0.20m resolution
  - 10 – 250m : 1m resolution
  - 250 – 1000m : 10m resolution
  - 1000 - 2000m : 50m resolution

We write a 11 easy steps procedure:

ProBioI11

Deployment procedure: 11 easy steps

- advantage: one configuration for all the float deployment
Live information from Float by sms or email

- confirmation that everything is OK at the deployment
- specific message if the float has a position failure
- Help in case of recovery

Subscribe to fresh news from your float !!!

Choose a float (If your float is not listed please contact schmechtig@obs-vlfr.fr)

- metbio001b, NAT_STG_xOA_metbio001b
- metbio002b, NAT_STG_xOA_metbio002b

What do you want?

- 1/ Only info during his deployment
- 2/ All info during his life included 1/ and 3/ (no SMS option)
- 3/ Only info in case of recovering (End of Life mode)

Enter your email address

And/or your phone number (Ex: 003366666666 for a French Cell)

OK

- 58 floats registered
- 22 followers
An automatic program for:

- time surfacing adjustment @ zenithal solar
- changing automatically the mission (eg: temporal resolution) according to the season

For other changes (limited number) a web interface is available:

- 1085 new mission sent
- 5600 profiles
Standard procedure after the deployment:

- Inspection of the 1st profiles
- After 2-days we turn off the descent measurement
- We set up the scientific sampling mission
- Sensor on at drift, either for science or for studying failure

➢ new mission after 2-3 days of control
### Feed back of the 70 floats

#### a. deployment

<table>
<thead>
<tr>
<th>Country</th>
<th>Nb Float</th>
<th>Person trained</th>
<th>sensors</th>
<th>Sensor/float</th>
<th>Use tools</th>
<th>Standard procedure</th>
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<tr>
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</table>

- we manage to keep the same procedure for 2 years with 70 floats and 6 different countries.
Thanks to the work before the deployment we have a homogeneous data set for 5600 European bio-floats profiles. -> good for bio DM QC.
Continue to have a standard and easy procedure to qualify sensor mounted on floats

-> good for the DM QC

The web page gives a summary of what a new user should do.
-> a pdf file with more general recommendations should soon release.

Important for the Bio parameters to be coordinated to develop harmoniously and efficiently Bio-Argo
Conclusion: what’s next?

We are planning of implementing a new phase when the float is on deck just before deployment new phase data:

- > calibration measurement
- > dark measurement
- > optode measurement in air before deployment

How it can be used?

- > open for new sensors procedure
- > used by the DAC no lost information
Thank you