



BOUSSOLE STATUS





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OUTLINE

- > Operational activities
 - summary
 - buoy data
 - monthly cruises data
- > Data exploitation
 - publications
 - SVC
 - website
- > Budget
 - funds
 - time
 - staff
- > Criticalities
 - example 1
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AT THE END OF 2016

	ACTIVITY	N	DAYS AT SEA	START
	mooring rotation	8	63	2000
	buoy rotation	22		
	monthly cruises	178	460/645*	2001
	on-demand cruises	115	115	2000

1.75 years

* 71 % of the scheduled cruises, the rest was canceled either due to bad weather, military restrictions or ship related issues

YEAR	N DAYS WITH A BUOY AT SEA	N DAYS WITH DATA ACQUISITION	DEPLOYMENT RATE (%) ^[1]	MEAS. RATE (%) ^[2]	
2003	91	90	100 ^[3]	99	85 %
2004	303	241	83	79	
2005	365	288	100	79	
2006	365	328	100	90	72 %
2007	344	303	94	88	
2008	207	133	57	64	
2009	365	254	100	69	94 %
2010	365	289	100	79	
2011	365	347	100	95	
2012	366	351	100	96	
2013	365	328	100	90	
2014	365	365	100	100	
2015	365	336	100	92	
2016	366	335	100	92	
TOTAL	4277	3699	95	86	

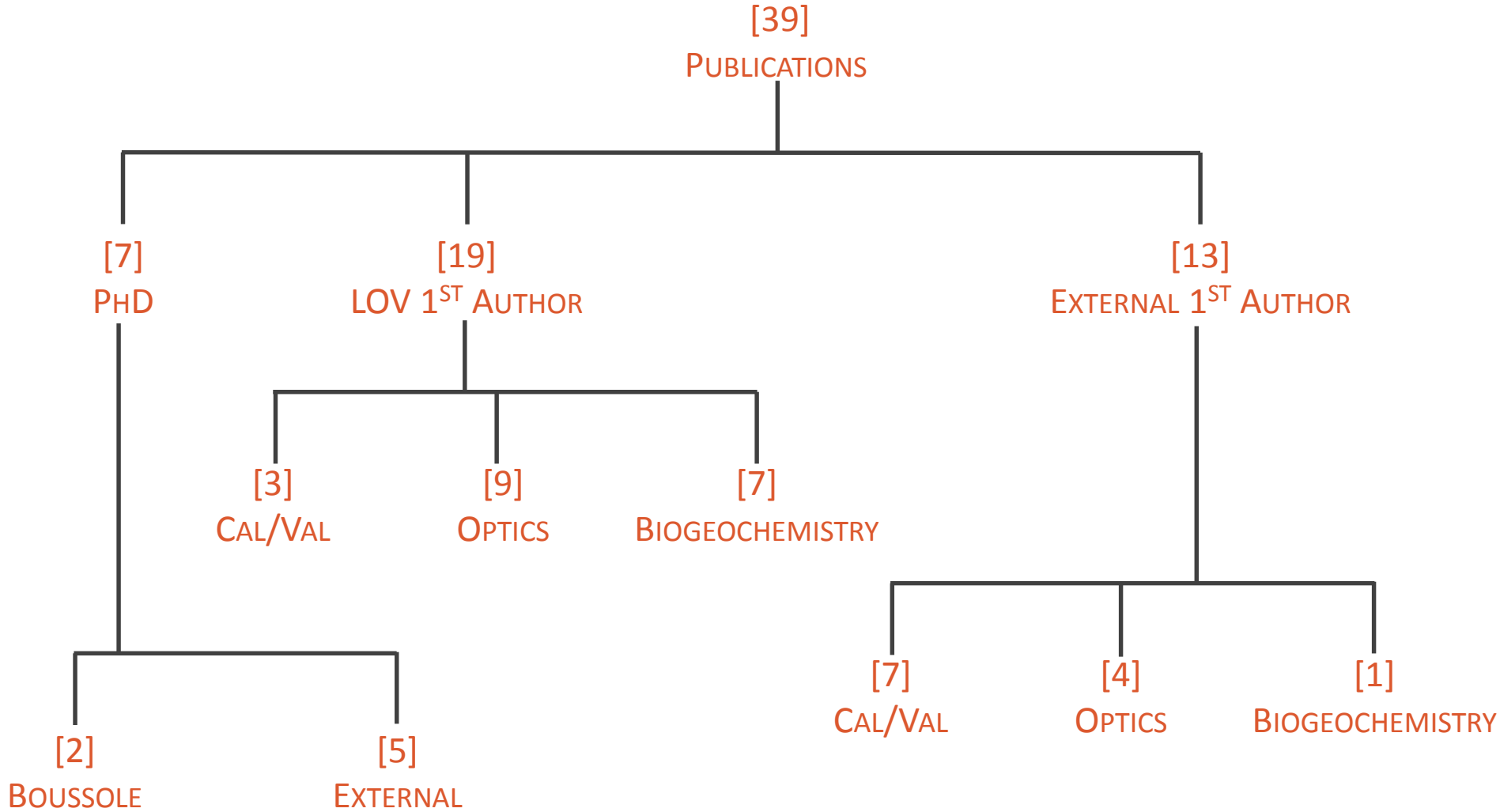


^[1] First table row divided by 365
^[2] 2nd table row divided by 1st table row
^[3] With respect to the project start in September 6, 2003

YEAR	CRUISES	CRUISE DAYS	WORKING DAYS	RADIOMETRY PROFILES	CTD IOPs	HPLC	SECCHI	CIMEL	TSM	CDOM
2001	6	16	10	51	21	9	0	33	0	0
2002	12	36	22	93	34	19	0	49	0	0
2003	11	31	19	114	66	17	0	95	0	0
2004	8	51	44	140	150	31	0	43	0	0
2005	11	42	32	61	110	28	9	79	3	7
2006	11	40	33	96	108	28	15	23	18	2
2007	11	40	32	74	92	25	14	33	14	4
2008	12	49	33	89	103	33	27	40	22	10
2009	11	41	28	83	67	31	26	5	27	4
2010	12	43	28	113	86	25	20	20	21	11
2011	13	47	39	133	118	35	25	18	30	13
2012	12	46	29	81	106	35	19	0	30	11
2013	12	43	26	65	85	25	20	3	23	11
2014	12	44	31	71	101	37	22	6	27	11
2015	12	43	33	60	112	33	28	18	28	12
2016	12	33	22	42	39	21	21	10	19	4
TOTAL	178	645	460	1366	1398	432	246	475	262	100

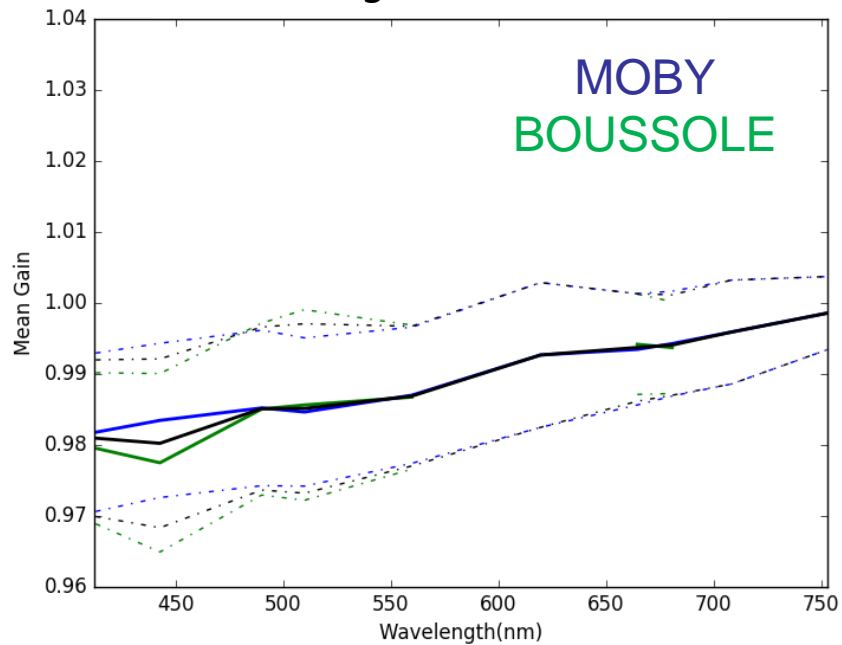
2016

- > Reduction of scheduled cruise days due to staff reduction
- > Better coordination with DYFAMED program

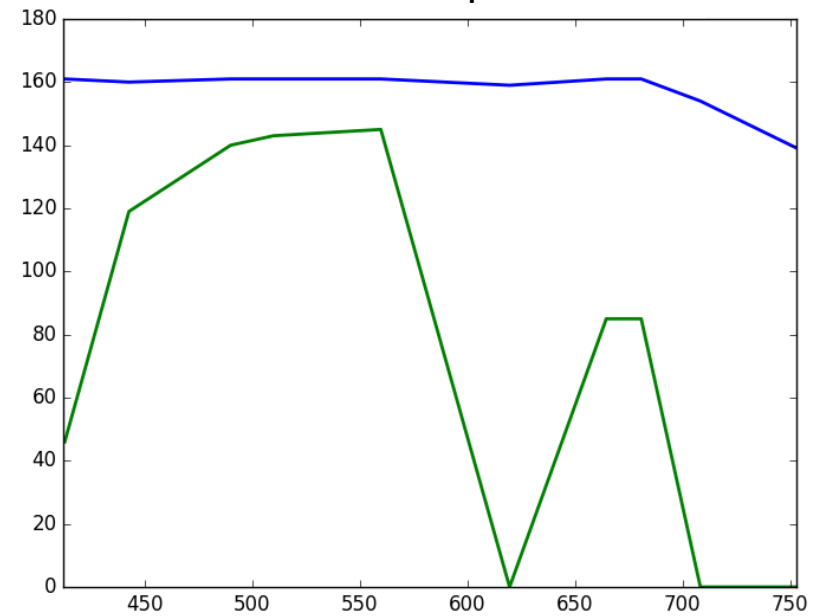


MERIS 4TH REPROCESSING (N. Lamquin ACRI-ST)

g-factor



Match-up N



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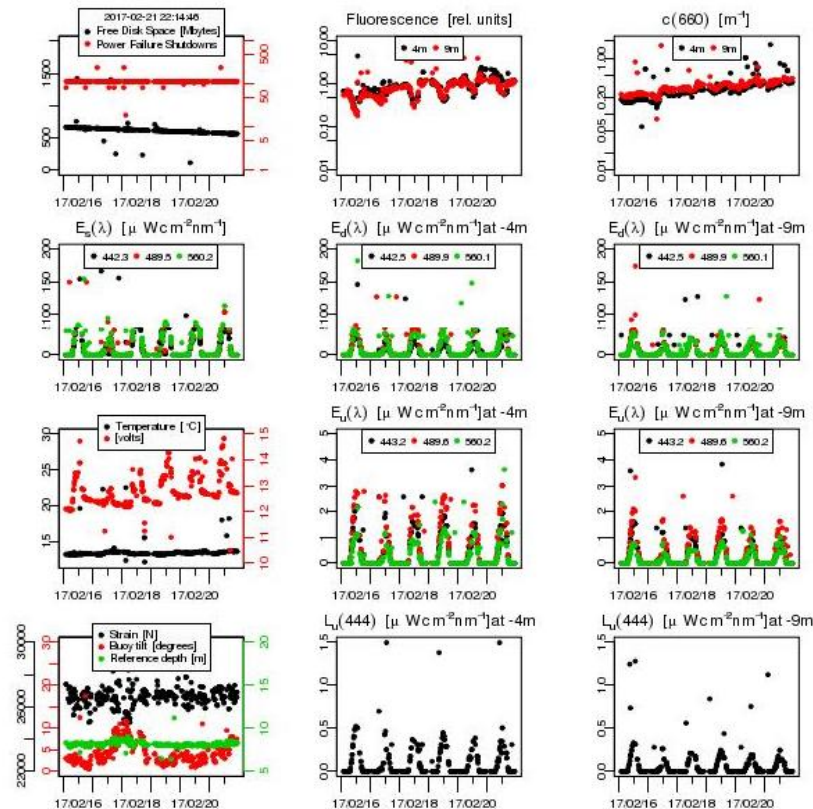
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Instrumentation
Calibration/validation operations
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Reports & publications

NEWS : FROM THE BUOY

Daily data summary from the BOUSSOLE buoy.

The plot below shows the last 5 days of data acquisition by the buoy, as they are transmitted nearly hourly via the ARGOS satellite system. **These data have not been quality controlled.** They are just used as a near-real time rapid check of what's happening on the measurement site. In addition, **the resolution of the data is degraded** as compared to the full data set that is downloaded during the monthly buoy servicing cruises.





CENTRE NATIONAL D'ÉTUDES SPATIALES

90 % of the funding, shared ~50/50 %



INSU
Institut national des sciences de l'Univers

Remainder 10 %



CONSOLIDATED BUDGET
(includes lab levy)
which is ~50 % of the total

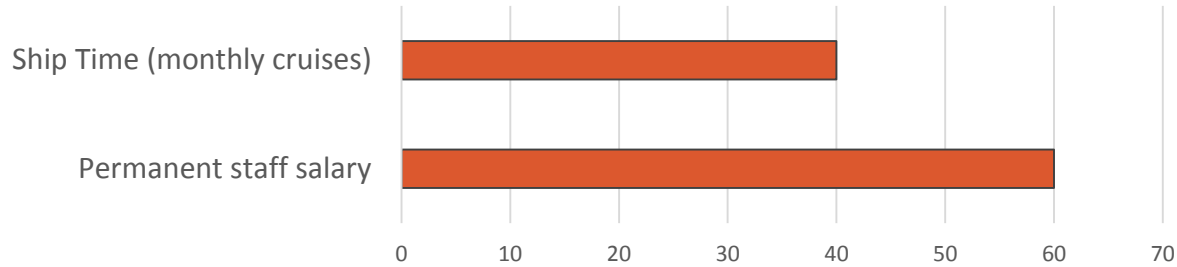


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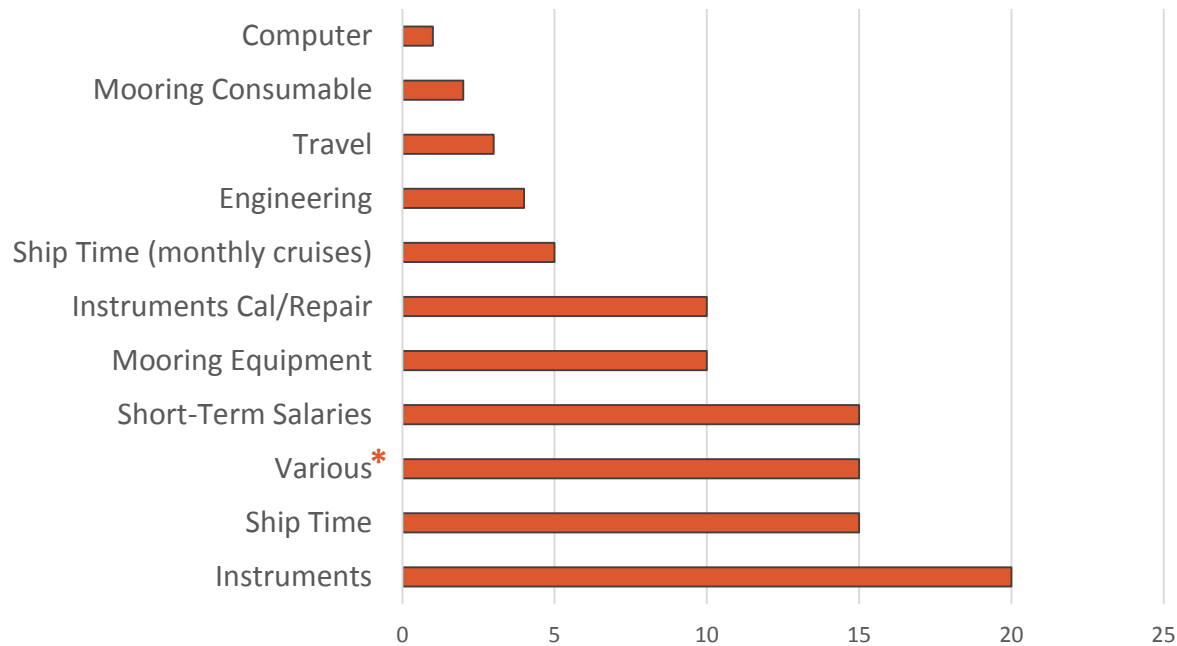
INSTITUTIONAL SUPPORT
~50 % of the total



INSTITUTIONAL SUPPORT (%)



CONSOLIDATED BUDGET (%)



* Various include: lab levy, cruise instruments, instrument shipping and custom fees, external divers, buoy paint, publications, lab consumable, insurance...

RESEARCH STAFF	PROJECT RESPONSIBILITIES	%
David ANTOINE	Project PI	20
Annick BRICAUD	CDOM measurements, IOPs expertise	10
TECHNICAL STAFF		
Vincenzo VELLUCCI	Project Management, buoy deployments, data processing	100
Melek GOLBOL	Responsible for monthly cruises, AOPs & IOPs acquisition and processing	100
Eduardo SOTO	CTD monthly cruises, technical support	25
Céline DIMIER	HPLC, a _p measurements	5
Josephine RAS	HPLC, a _p measurements	5
Vincent TAILLANDIER	CTD maintenance and post-processing	5
Edouard LEYMARIE	<i>Montecarlo</i> simulations	5
Guillaume DE LIEGE	Management of diving operations on the buoy, technical support	10
David LUQUET	Diving operations on the buoy	5
Didier ROBIN	Diving operations on the buoy	5
POSTDOC		
Marco BELLACICCO	Phytoplankton photo-adaptation and diel cycles	50
EXTERNAL EXPERTISE		
Agnieszka Bialek (NPL)	Uncertainty Budget	30
Satlantic, Wetlabs, Hobilabs, Seabird	Calibrations	25/30?
Various	Buoy revision, divers for buoy rotation	15

About 4.25 FTE

IN CHRONO-PHAGE ORDER

- > Sea going (including pre- and post-cruise activities)
- > Management (reports; proposal submission; local, national and international project animation...)
- > Data QC
- > Buoy preparation and deployments
- > Lab analyses
- > Data processing
- > Support to data users
- > ...

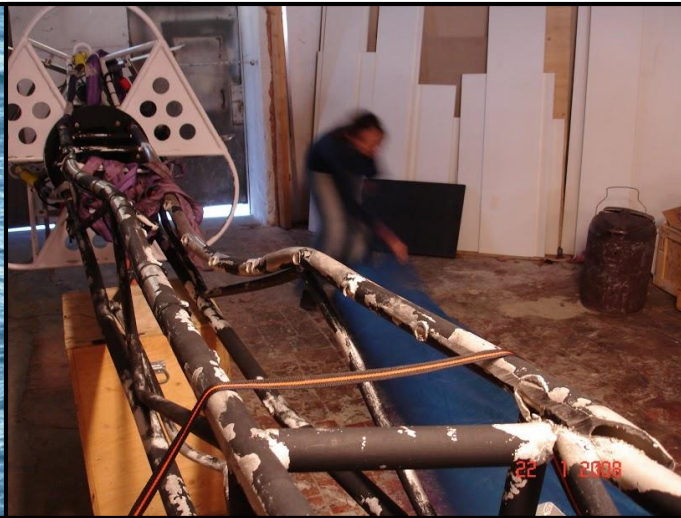
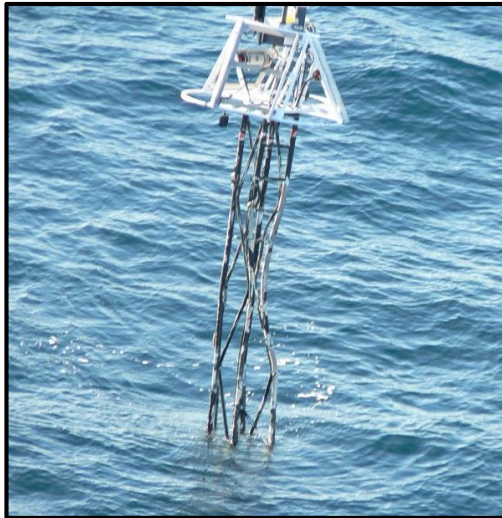
IN PRIORITY ORDER

- > Buoy preparation and deployments
- > Sea going (including pre- and post-cruise activities)
- > Support to data users
- > Management (reports; proposal submission; local, national and international project animation...)
- > Data processing
- > Data QC
- > Lab analyses
- > ...

PUBLICATIONS AND MEETINGS ARE SOMEWHERE IN THE CLOUD

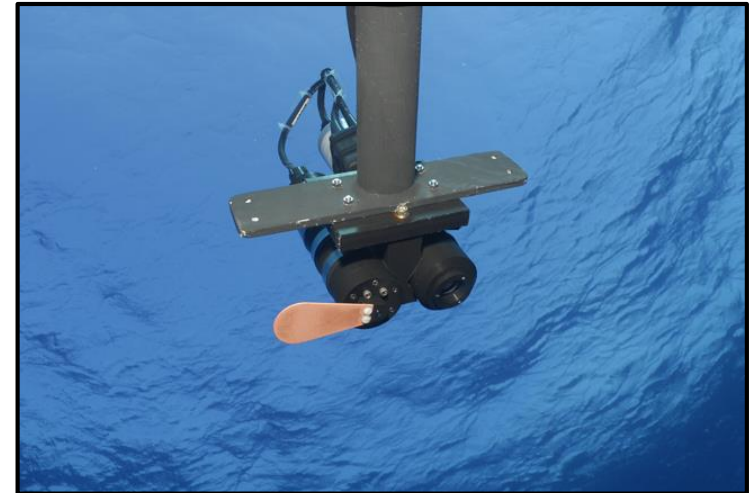
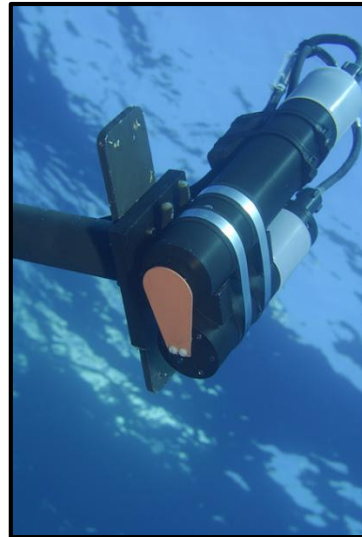
2008 SIGNIFICANT DATA LOSS

- > Rotation of only two systems is a risk (other than leaving a little time for radiometer characterization)
- > Take a good insurance (other accidents occurred in BOUSSOLE history)



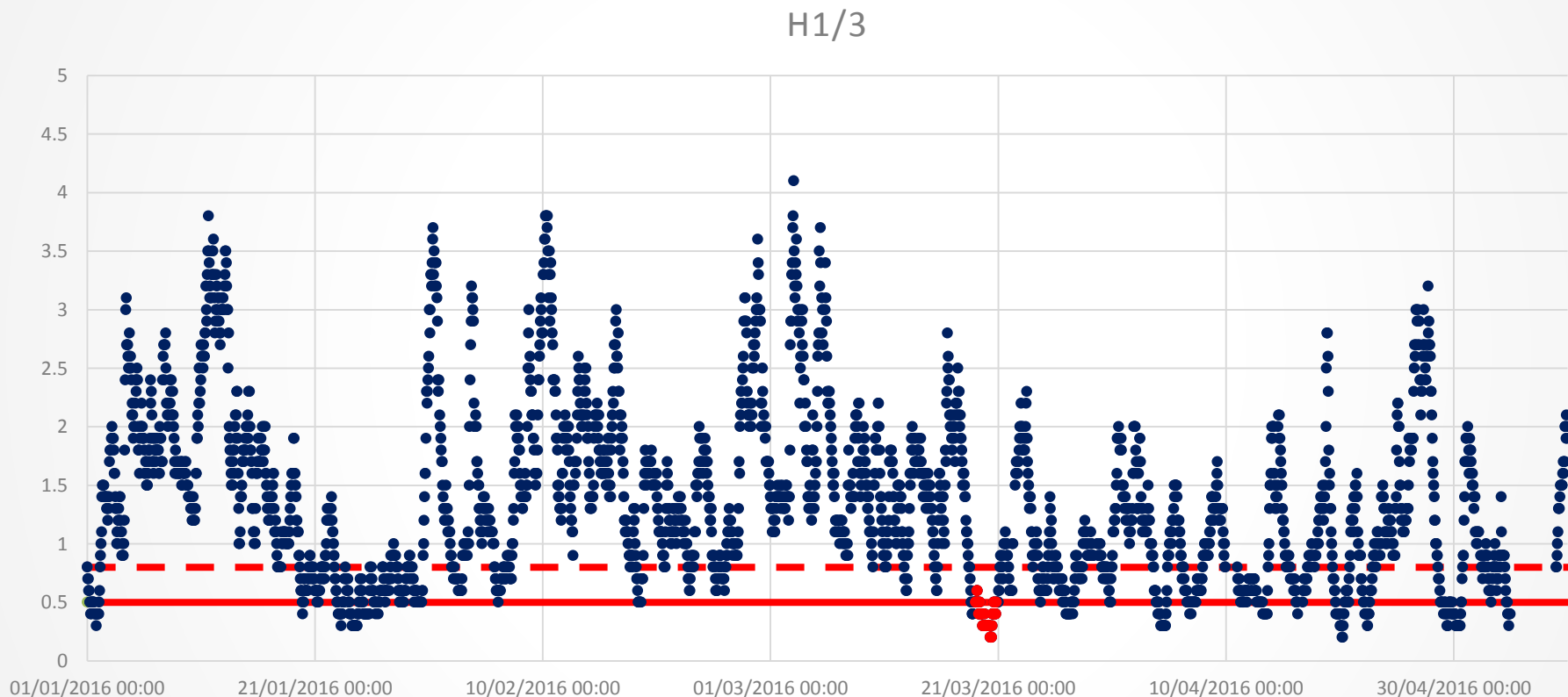
2008-2010 MEASUREMENT RATE REDUCTION

- > Introduction of hyperspectral instruments and bio-shutters
- > If it works in the lab it does not mean it will work in experimental conditions



INCREASED DURATION OF DEPLOYMENTS

- > Increased number of instrument (from 7 to 13 radiometers)
- > More characterization (cosine scans, pre-launch characterization)
- > Aging instrument require more pieces replacement
- > Longer return time from factory
- > Weather sometime does not help



DATA PROCESSING

- > Provide data with associated uncertainty
- > Include corrections for bidirectionality (tilt)
- > Improve the QC procedures (hyperspectral)

PLATFORM

- > Reduce buoy weight
- > Better distribution of weights
- > Increase energy availability
- > Articulated arms to ease deployments

INSTRUMENTATION

- > Replacement of multispectral instruments and data loggers (fresh news no more maintenance by Satlantic from this week!)
- > Improve the QA procedures (more standardized pre- and post-deployment, golden sensor for intercalibration)
- > Real time data transmission
- > Re-introduce bio-shutters
- > Triplicate essential radiometers (*Es*, *Lu*) to insure regular 6-months rotations

OPERATIONAL CHALLENGE

- > Repeated deployment/recovery of ProVal float near BOUSSOLE

OPERATIONAL ASPECTS

- > You need a reasonable distance from your facility for operational activities
- > ...and a reasonable distance offshore to limit anthropic perturbation/damage
- > Take care of details (not obvious on the long-term)
- > ...

MANAGEMENT ASPECTS

- > Involvement of motivated people in long term activities is crucial, feeding motivation over time too
- > Cruises are mandatory for buoy maintenance and auxiliary data collection, they are also a terrific vehicle for collaboration, science, inter-comparison exercise...
- > Ideally set-up a team with high dynamic range of capabilities of individuals, practically try to fit tasks and responsibilities to people expertise and will
- > ...

CONTINUOUS FEEDBACK BETWEEN OPERATIONAL ACTIVITIES AND SCIENCE IS A KEY FACTOR TO SUCCEED OVER THE YEARS

WOULD I DO IT AGAIN ?
BONUS QUESTION?

THANKS FOR ATTENTION

D. Antoine – PI
V. Vellucci – Project Manager
M. Golbol, E. Soto, E. Diamond – Cruises
V. Taillander – CTD processing
C. Dimier, J. Ras – HPLC
B. Gentili – Code development
A. Bialek – Uncertainties
E. Leymarie – Montecarlo simulations
Bricaud – CDOM
G. De Liege, D. Luquet, D. Robin – Diving
S. Marty – Calibrations
J. Uitz, H. Claustre, F. D'Ortenzio – Expertise
L. Fere, C. Poutier, I. Courtois – Administration