



JOINT EUROPEAN RESEARCH INFRASTRUCTURE NETWORK FOR COASTAL OBSERVATORIES

# FIRST CALIBRATION EXPERIMENT AND PERSPECTIVES

*Ifremer Brest – Metrology laboratory*

F. Salvetat **I** Ifremer **I** [florence.salvetat@ifremer.fr](mailto:florence.salvetat@ifremer.fr)



## JERICO CONTEXT

Sharing experiences,  
practices  
through networking

Data Assurance Quality



**Metrology**

**Jerico WP4**



## IFREMER'S METROLOGY LABORATORY



### The metrology laboratory:

Dedicated to physical and physico-chemical oceanographic parameters:

Temperature (Cofrac), pressure (Cofrac), salinity (conductivity), velocity, ocean current, dissolved oxygen, pH, turbidity, fluorescence.



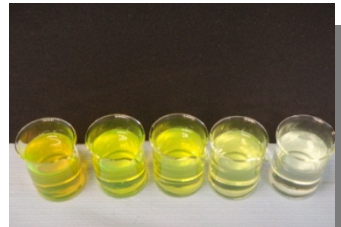
Salinometer

[www.jerico-fp7.eu](http://www.jerico-fp7.eu)

Fresh water or seawater bath  
(800l)



Formazin solutions



Fluorescein solutions



Towing canal

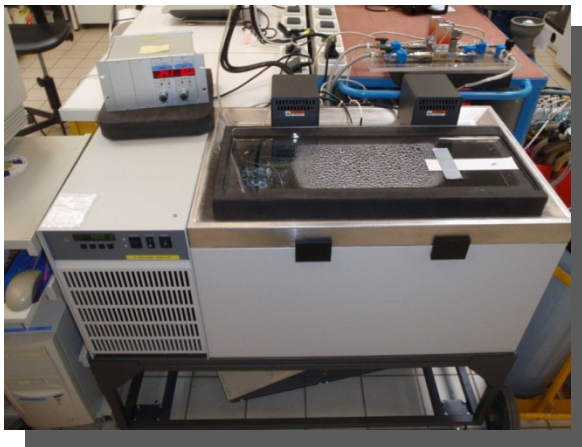
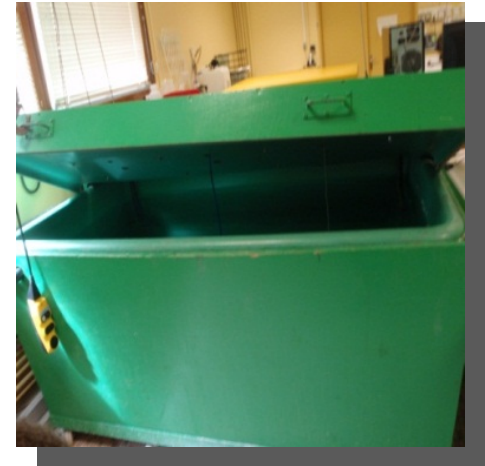


## THE EXPERIMENT

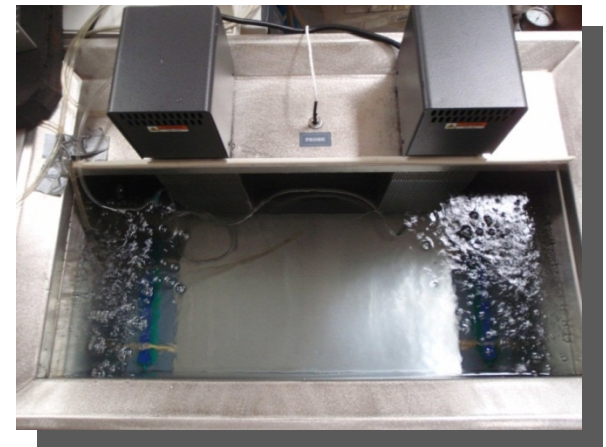
### Calibration experiment:

- Conductivity
- Temperature
- Oxygen

Fresh water or  
seawater bath (800l)



Fresh water or  
seawater oxygen  
bath (100l)





## THE EXPERIMENT

### Temperature /conductivity calibration: (Cofrac in temperature)

- Calibration points

Salinity	Temperature (°C)
35	5
	15
17	15
10	20



## THE EXPERIMENT

### Temperature /conductivity calibration: (Cofrac in temperature)

- Protocol

Comparison to Standard Platinum Resistance Thermometer and autosal salinometer (both calibrated).

SPRT



Resistance  
bridge



Salinometer



## THE EXPERIMENT



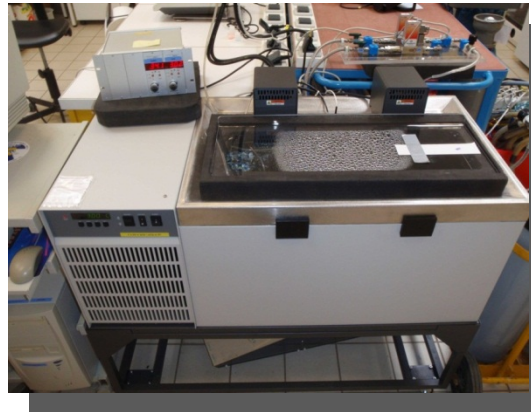
### Temperature /conductivity calibration: (Cofrac in temperature)

- Temperature calibration uncertainty (for Seabird)

$$U = +/- 10 \text{ m}^\circ\text{C}$$



$$U = +/- 40 \text{ m}^\circ\text{C}$$



100L bath  
(heterogeneity  
less than  
10m°C)



800L bath  
(heterogeneity=4  
0m°C)



## THE EXPERIMENT

### Dissolved oxygen calibration:

- Calibration points

Dissolved Oxygen	Temperature (°C)	Salinity
100%	20	0
(air equilibrium)	10	0
50%	20 or 10	0



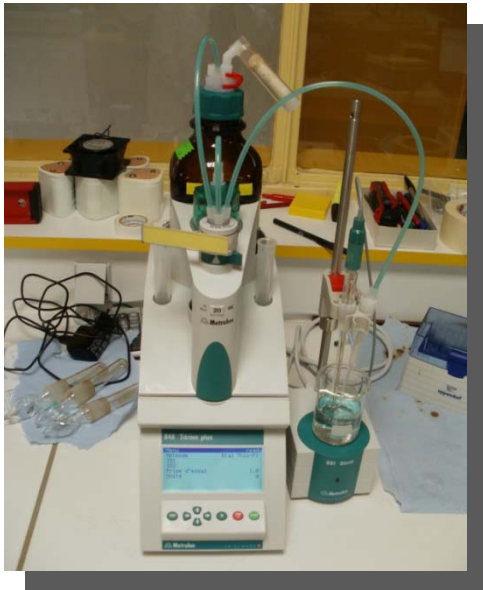


## THE EXPERIMENT

### Dissolved oxygen calibration:

- Protocol

Comparison to Winkler analysis.



Winkler titrator



Winkler samples



## THE EXPERIMENT

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### **Dissolved oxygen calibration:**

- Dissolved oxygen calibration uncertainty

Expectation:  $U = \pm 4 \mu\text{mol/L}$

Depend on sensors uncertainty components.



## THE EXPERIMENT



### The experiment:





**The experiment:**

**Participating laboratory:**

- HCMR (Greece): Tanya Tsagaraki, Manolis Ntoumas and George Petihakis

Sbe37-SIP CT sensor and Aandera 3830 DO optode

- CNR-ISMAR (Italy): Stefania Sparnocchia and Elio Paschini

Sbe19 plus CTD sensor and Sbe43 DO sensor

- AZTI Tecnalia (Spain): Carlos Hernandez

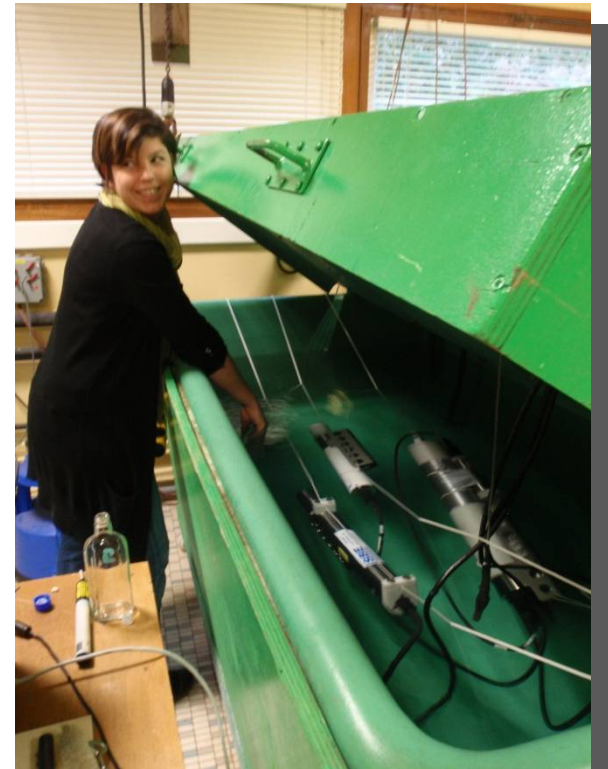
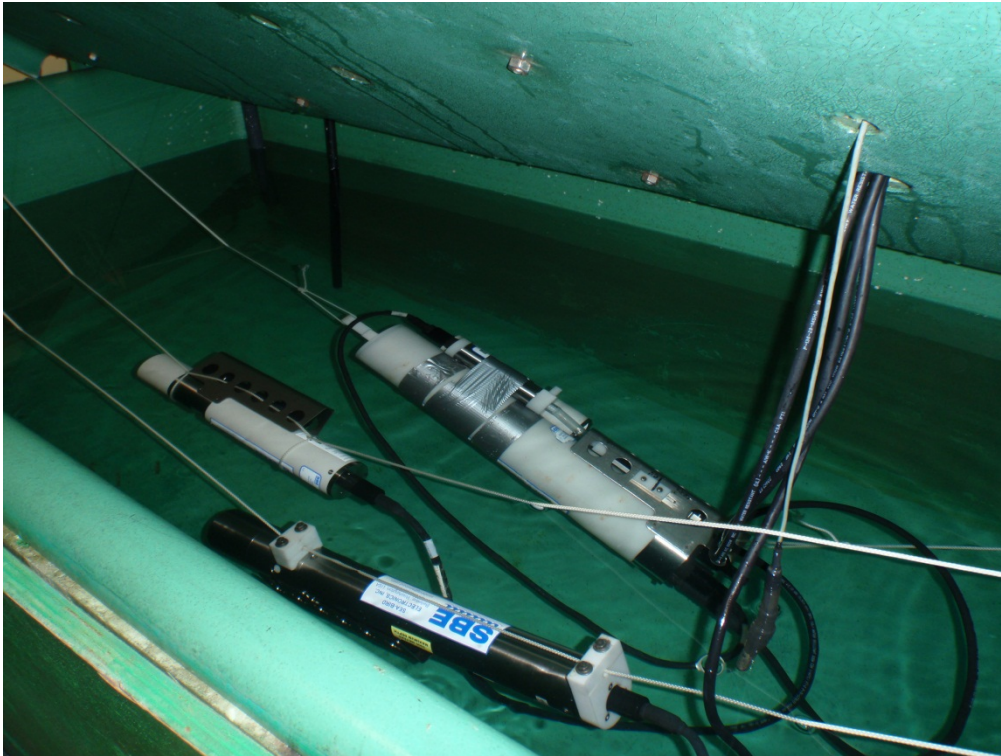
Sbe37-SMP CTD sensor and Aanderaa optode



## THE EXPERIMENT

**The experiment:**

**Conductivity and temperature (in progress)**



## THE EXPERIMENT



### The results:

- Calibration certificates or reports for each institute
  - Inter Laboratory Comparison anonymous report.
    - Calculation of the normalized En scores (indication of laboratories agreement)
- or
- Comparison of the sensors errors



### Perspectives

- Testing other parameters (turbidity, fluorescence, ...)
- Testing different sensor technologies (conductivity sensor: inductive or electrodes sensors)
- Comparing different calibration protocols performed in different institutes.
- Performing in field experiments (ACT ?)



**THANKS FOR YOR ATTENTION**