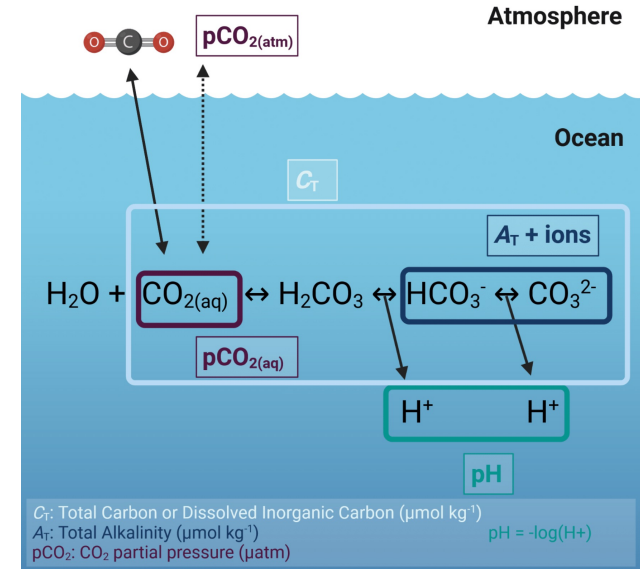



# APPORT DES MÉTHODES NEURONALES POUR L'ÉTUDE DU SYSTÈME DES CARBONATES EN MÉDITERRANÉE

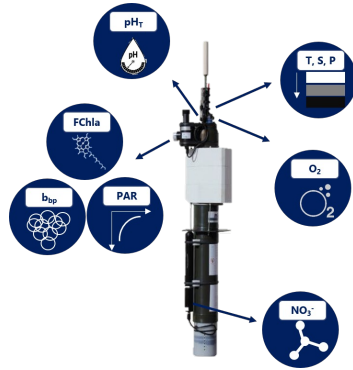
## BIOGEOCHEMICAL SPECIFICITIES OF THE MEDITERRANEAN SEA

- Absorbs more anthropogenic  $\text{CO}_2$  per unit area (Palmiéri *et al.*, 2015), rapid ventilation allow for deeper  $\text{CO}_2$  penetration (Schneider *et al.*, 2014).
- High  $A_T$  values (high S).
- Remineralization in intermediate layers lower pH and increase  $G_T$  (Urbini *et al.*, 2020, Àlvarez *et al.*, 2014).
- Decrease in surface pH  $-0,055$  to  $-0,156$  (Hassoun *et al.*, 2020) vs in the global ocean  $-0,0015$  to  $-0,0024$  /year (Tanhua *et al.*, 2015).

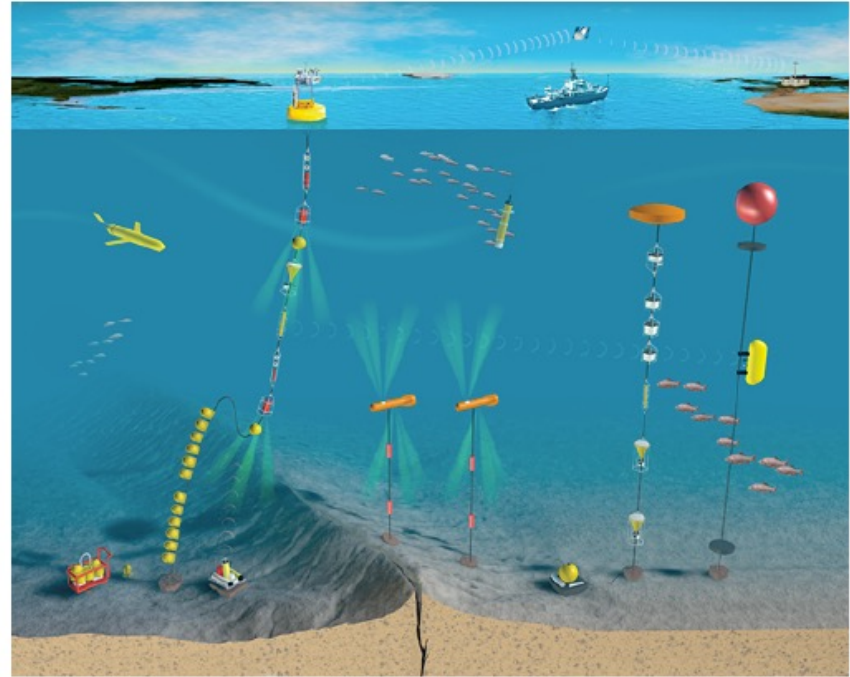


## WAYS TO OBSERVE THE OCEAN

- Cruises. 
- Buoys.
- Satellites.
- Moorings.
- Gliders.
- Profiling floats.



Systematic measurements of **P, T, S, and O<sub>2</sub>**.  
 Some carbonate sensors, but issues remain..



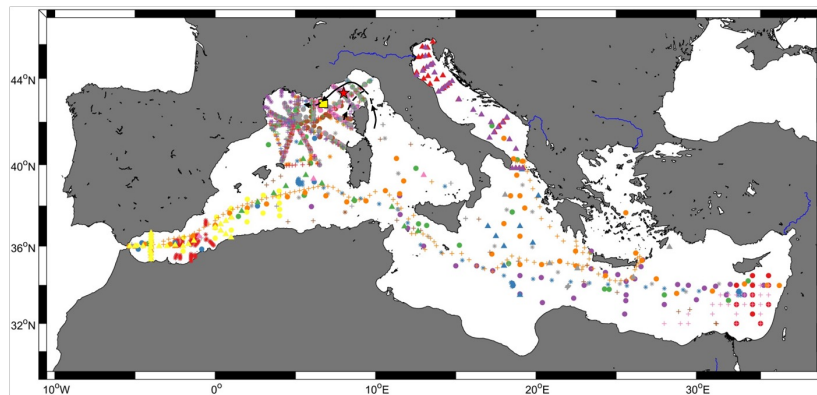
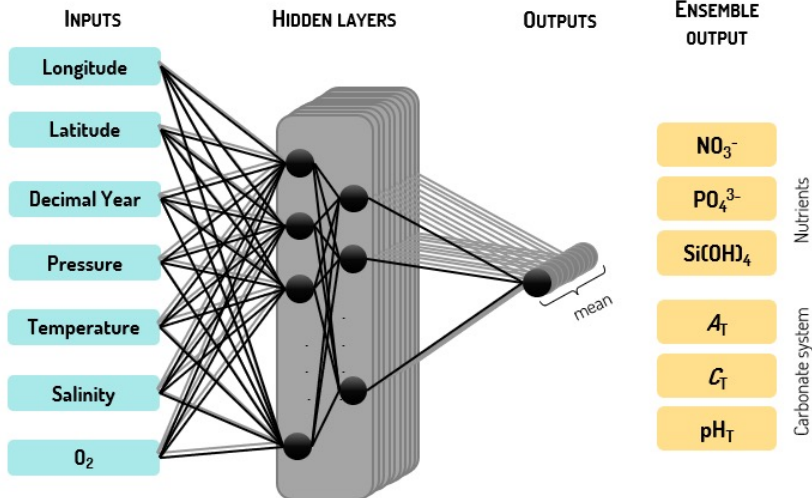
Global Ocean Observing System



35 cruises (based on CARIMED, and 1 time series: DYFAMED).  
**1981-2018.**

## A Regional Neural Network Approach to Estimate Water-Column Nutrient Concentrations and Carbonate System Variables in the Mediterranean Sea: CANYON-MED

Marine Fournier<sup>1\*</sup>, Laurent Coppola<sup>2</sup>, Hervé Claustre<sup>1</sup>, Fabrizio D'Ortenzio<sup>1</sup>,  
 Raphaëlle Sauzède<sup>2</sup> and Jean-Pierre Gattuso<sup>1,2</sup>



Cruises		
* ALMOFRONT	● METEOR_51_2	+ PACIFIC_CEBELES
* BOUM	● METEOR_84_3	+ POEMXXIS
* CARBOGIB	● MILLERO	+ PROSOPE
* CASCADE	● MOOSE_GE_2010	▲ SESAME_IT01
* DEWEX	● MOOSE_GE_2011	▲ SESAME_IT_02
* DYFAMED	● MOOSE_GE_2012	▲ SESAME_IT_04
* GEOSCS_LEG_3	+ MOOSE_GE_2013	▲ SESAME_IT_07
* GIFT	+ MOOSE_GE_2014	▲ SESAME_SPI
* HOTMIX	+ MOOSE_GE_2015	▲ SESAME_SPII
● MCXXIS	+ MOOSE_GE_2016	▲ SOMBA
● MEDIPROD IV	+ MSM17	▲ TRANSMED_LEGII
● MEDSEA_2013	+ OTRANTO	▲ TRANSMED_LEGIII

	RMSE	Mediterranean range
A <sub>T</sub> (μmol/kg)	13	2350 - 2750
C <sub>T</sub> (μmol/kg)	12	2000 - 2400
pH <sub>T</sub>	0,014	7,95 - 8,22



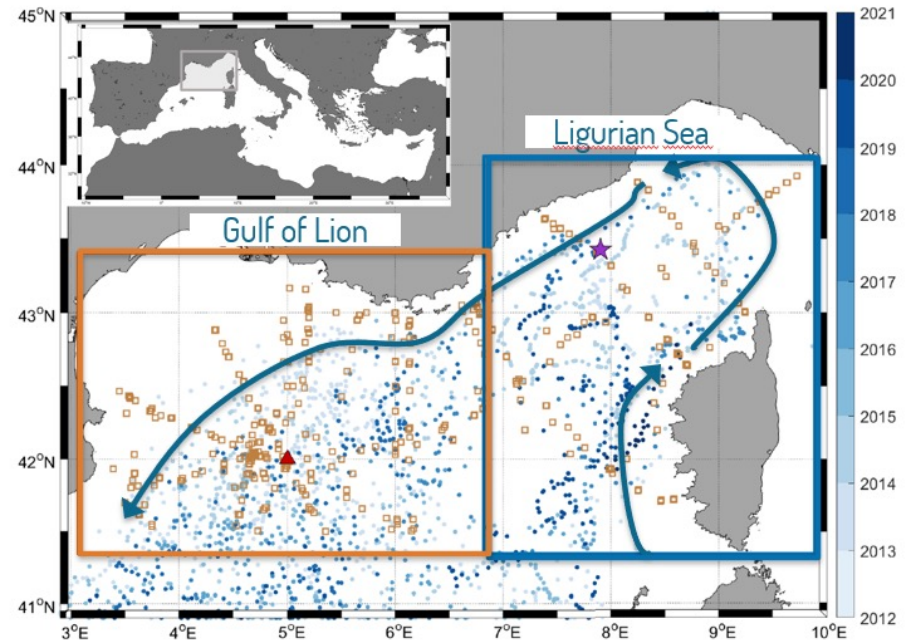
## Impact of Intermittent Convection in the Northwestern Mediterranean Sea on Oxygen Content, Nutrients, and the Carbonate System

Marine Fourrier<sup>1</sup>, Laurent Coppola<sup>2</sup>, Fabrizio D'Ortenzio<sup>1</sup>, Christophe Migon<sup>1</sup>, and Jean-Pierre Gattuso<sup>1,3</sup>

<sup>1</sup>Laboratoire d'Océanographie de Villefranche, CNRS, Sorbonne Université, Villefranche-sur-Mer, France, <sup>2</sup>CNRS, OSU STAMAR, UAR2017, Sorbonne Université, Paris, France, <sup>3</sup>Institute for Sustainable Development and International Relations, Sciences Po, Paris, France

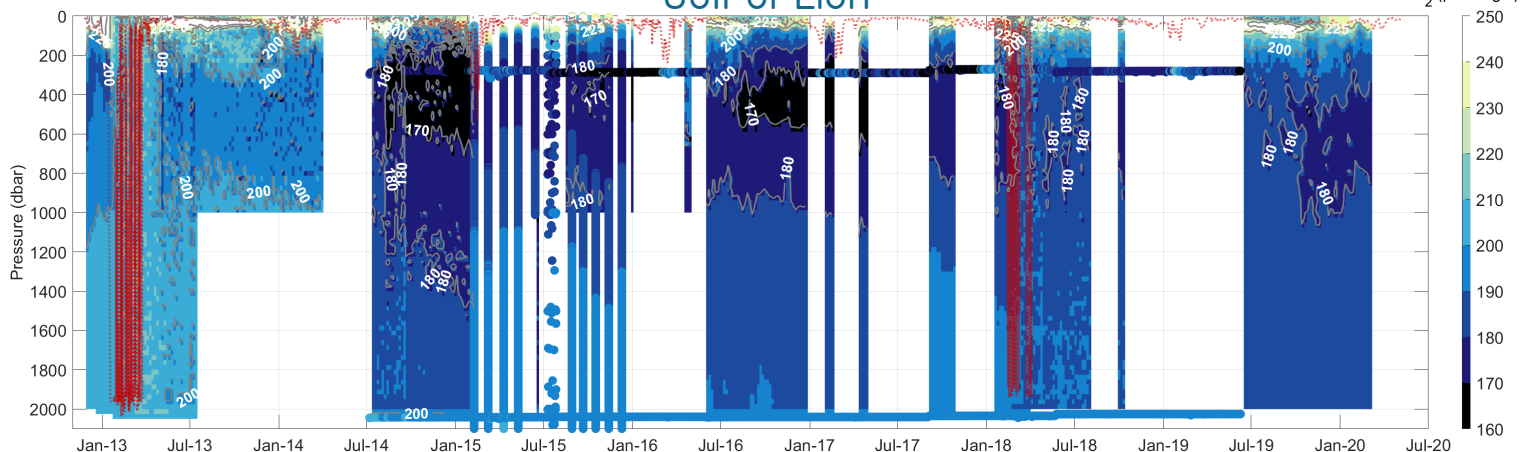
### DATASET

- BGC-Argo floats
- Cruises
- Moorings
  - LION
  - DYFAMED



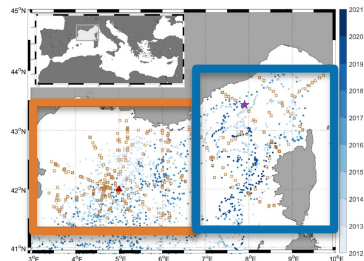
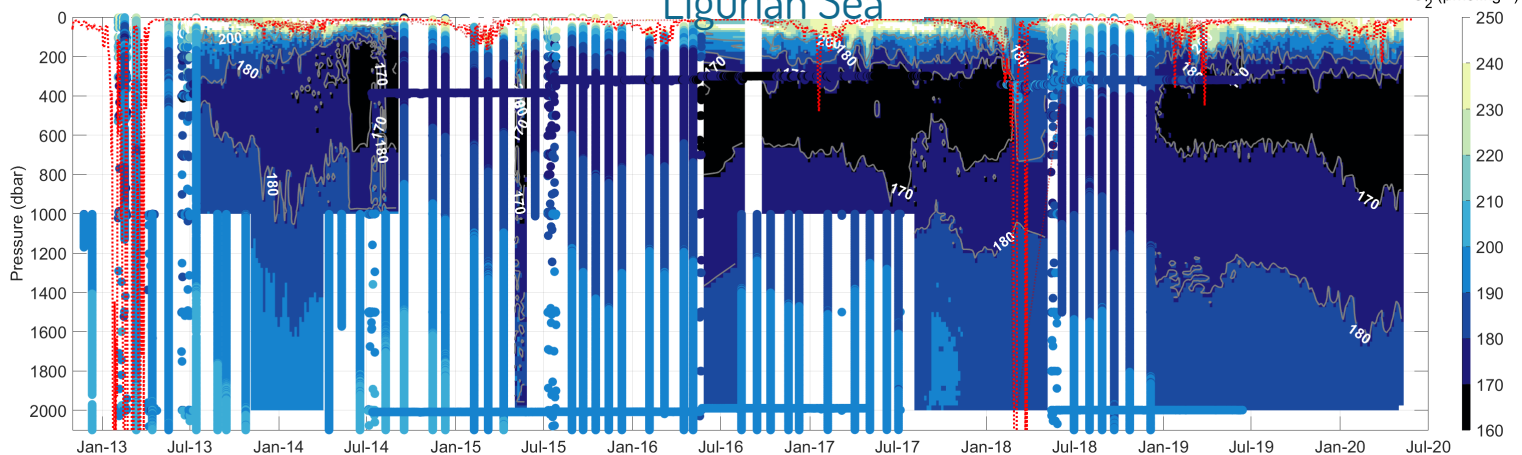
## Gulf of Lion

O<sub>2</sub> (μmol.kg<sup>-1</sup>)

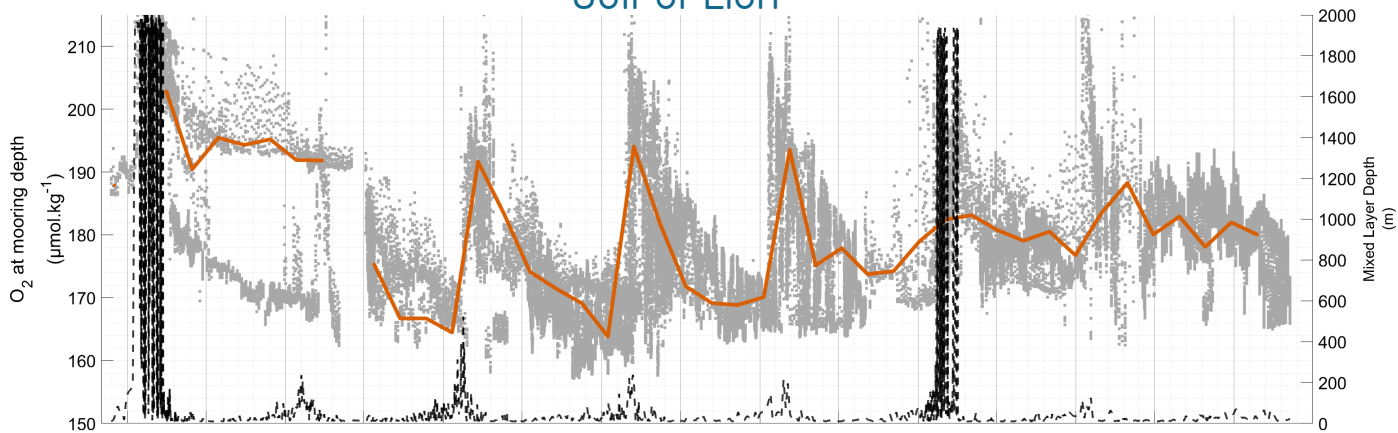


## Ligurian Sea

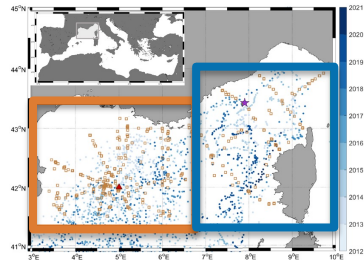
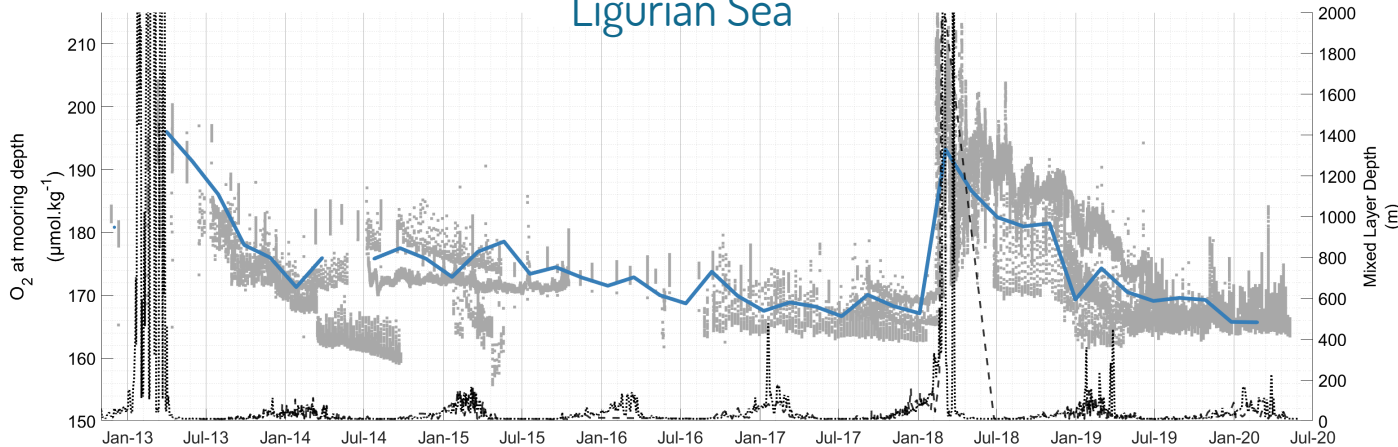
O<sub>2</sub> (μmol.kg<sup>-1</sup>)

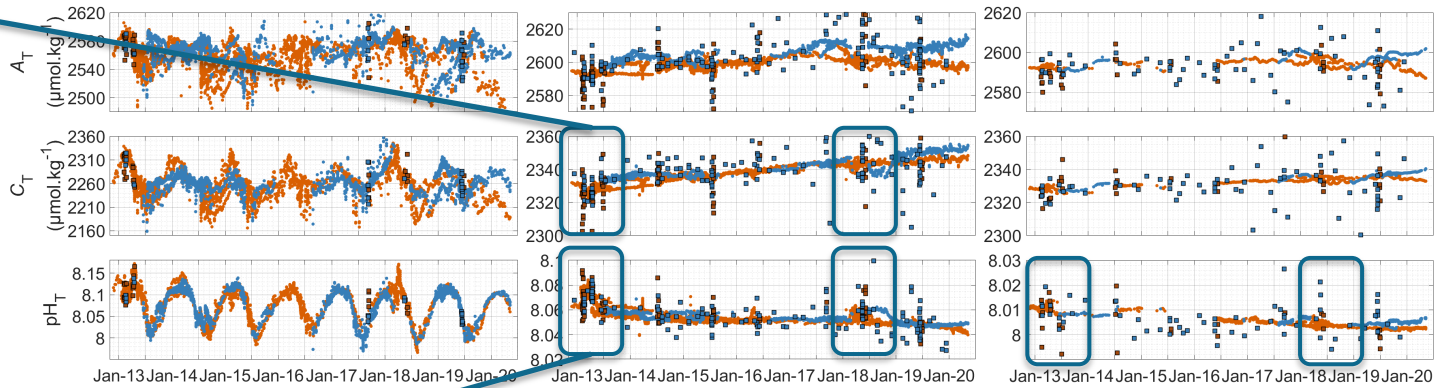
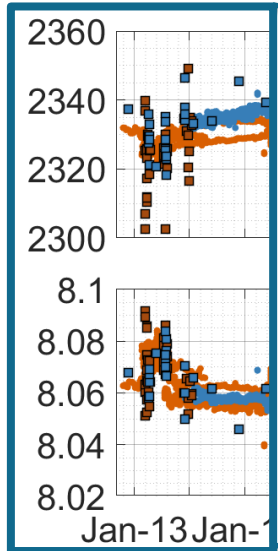


## Gulf of Lion



## Ligurian Sea

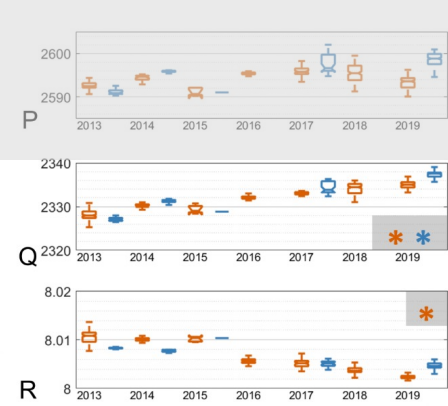
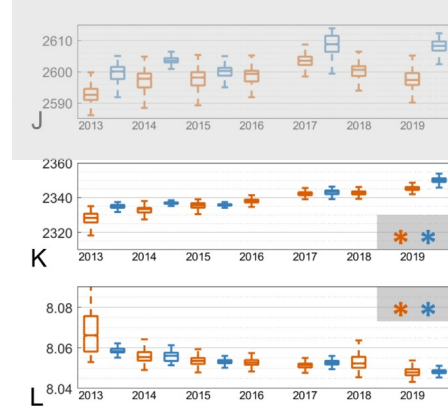
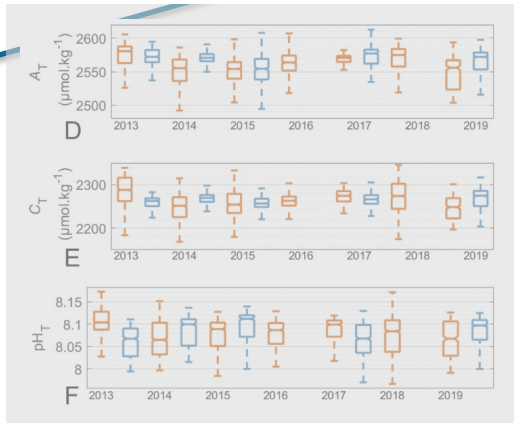
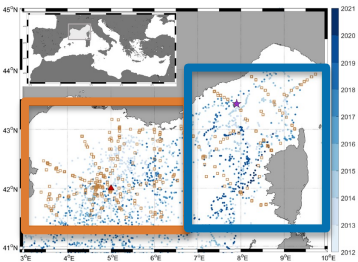




Surface

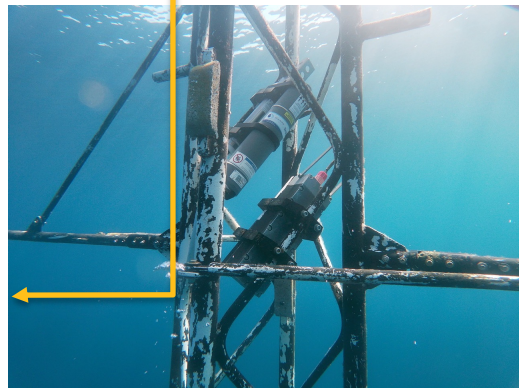
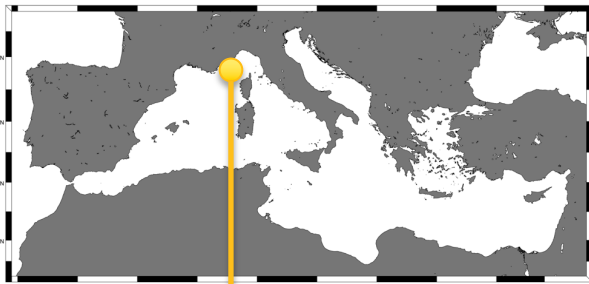
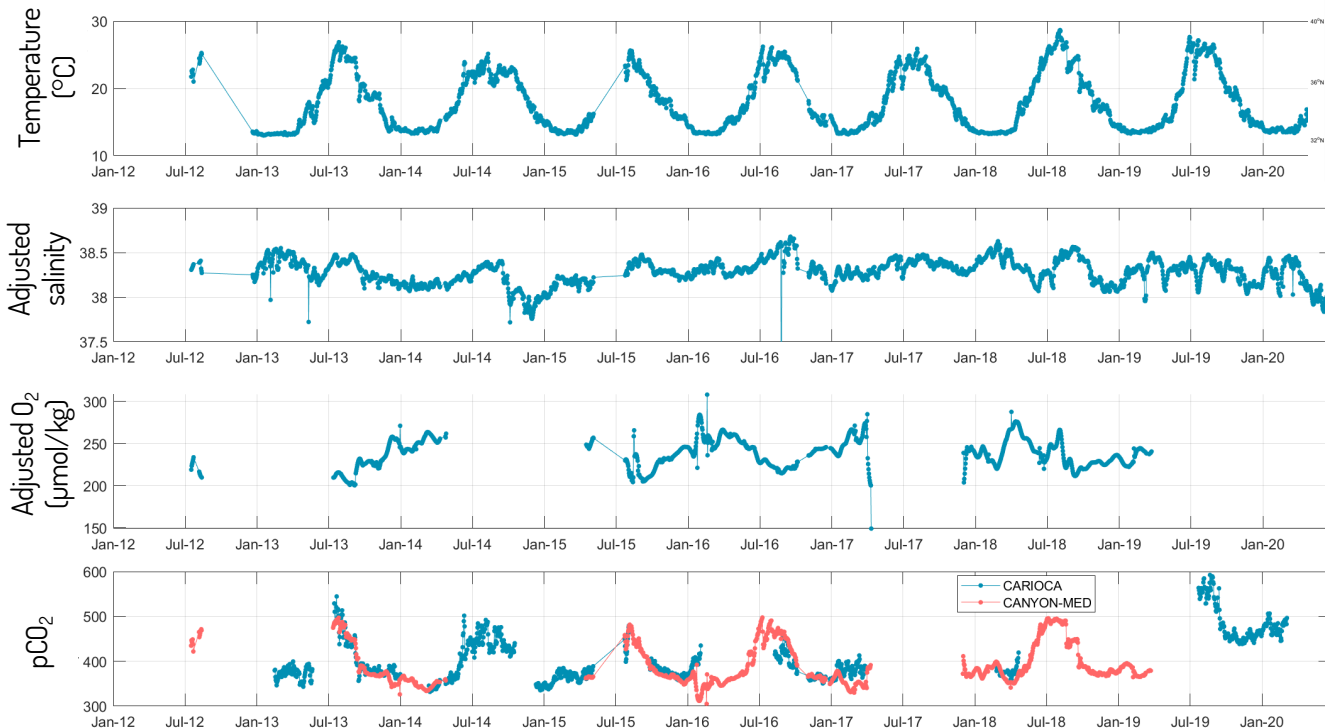
LIW

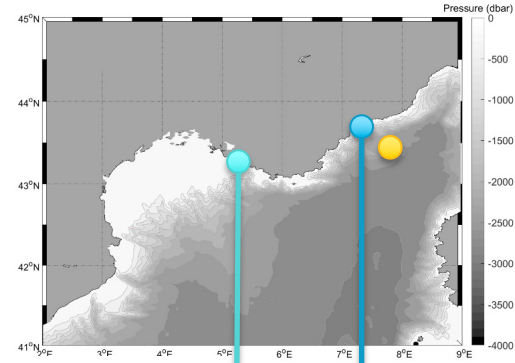
2000m



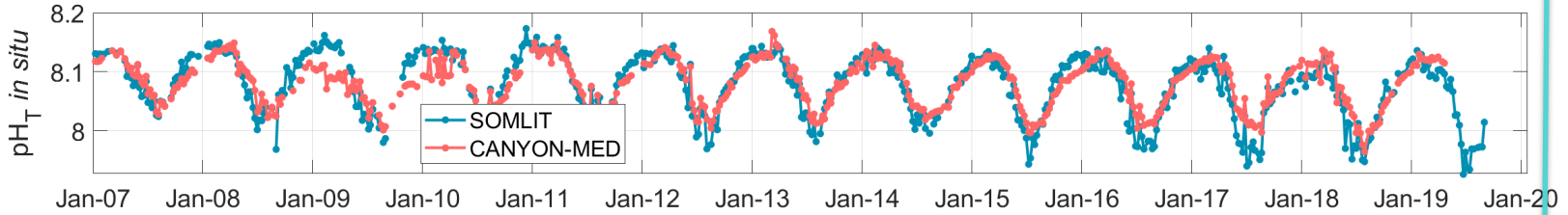


## Dyfamed/Boussole site





● Point B



● Solemio

