

FUMSECK - First Results

CNES, MIO, 06/04/2020

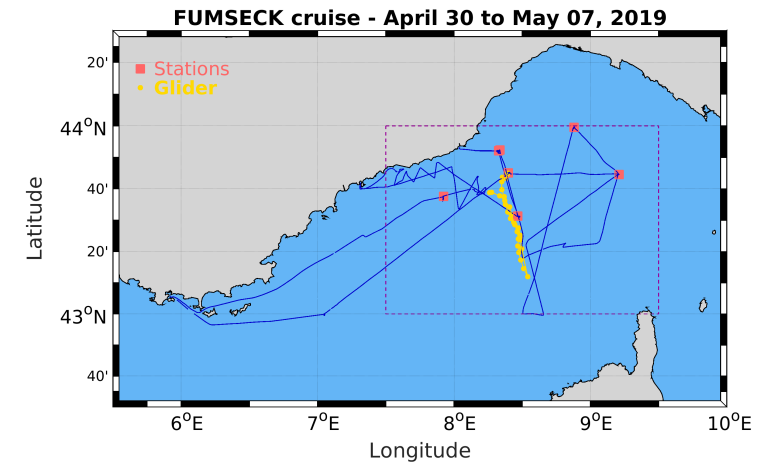
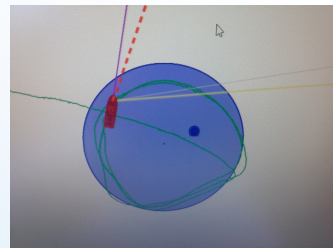
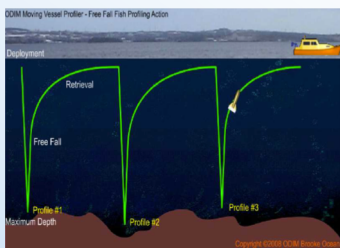
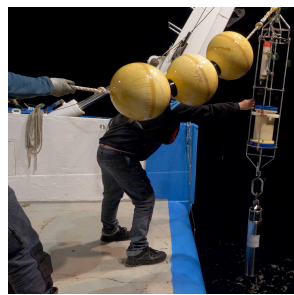
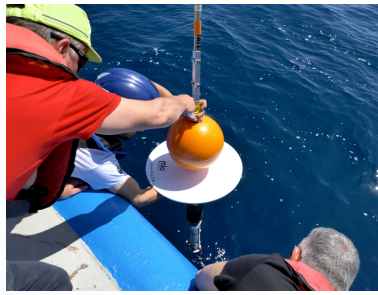
*Stéphanie Barrillon (MIO), Caroline Comby, Andrea Doglioli, Jean-Luc Fuda,
Gérald Grégori, Francesco d'Ovidio, Anne Petrenko, Melilotus Thyssen, Roxane
Tzortzis and the BIOSWOT collaboration*



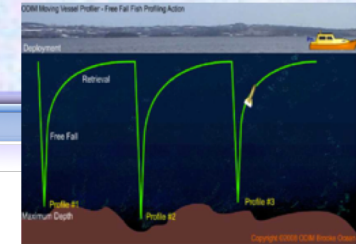


FUMSECK (*Facilities for Updating the Mediterranean Submesoscale - Ecosystem Coupling Knowledge*), Apr 30 - May 07 2019, Ligurian Sea. R/V Téthys II (S. Barrillon)

- Technological cruise
- Tests on **MVP**, vertical velocities measurement, **biodegradable micro particles tracers**

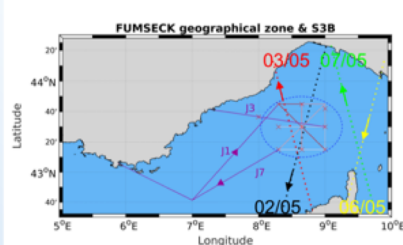
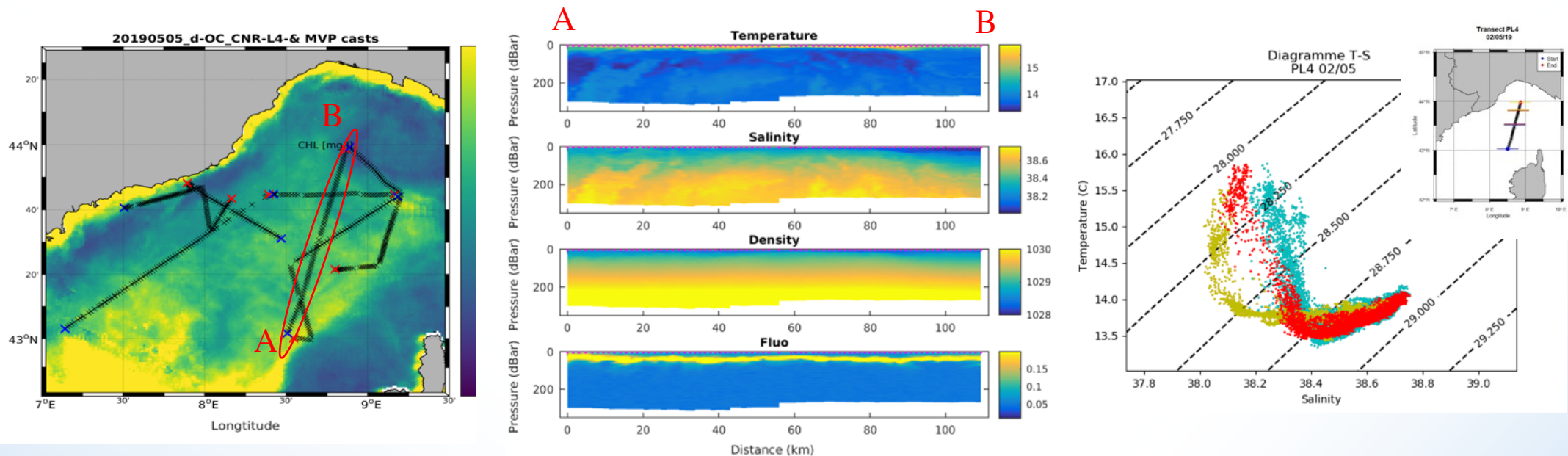


- OSCAHR zone. Lagrangian strategy



⚓ MVP tests

🗨️ 7 transects of mean 8h30 duration. Few minutes to deploy and retrieve



2019-05-02 09:58:07 (UTC)
8.6845 43.5230
on the middle of S3B satellite track !



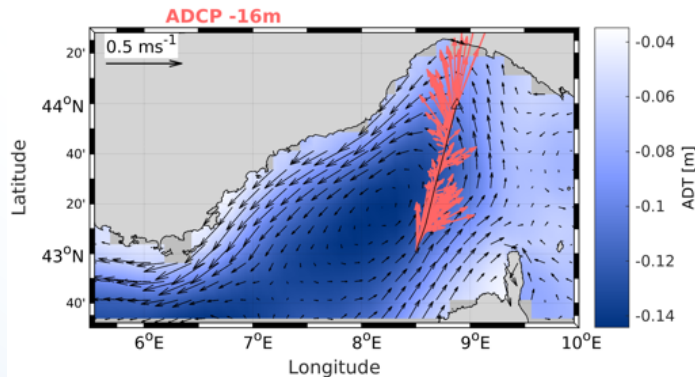
ADCP and satellite data



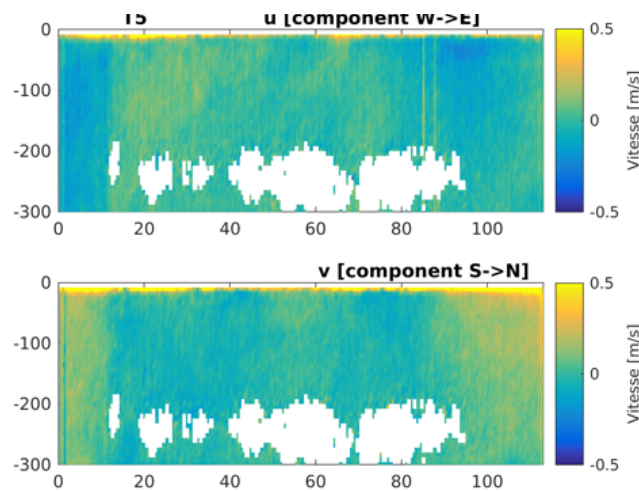
ADCP: currents

(Acoustic Doppler Current Profiler)

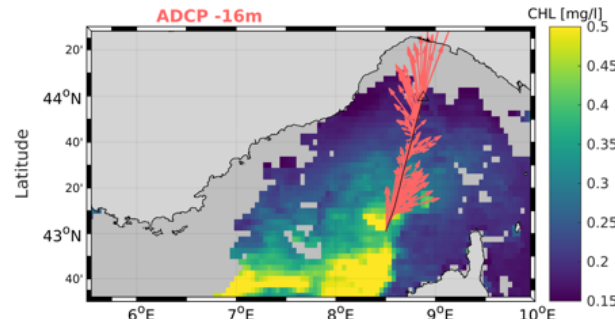
Altimetry → currents



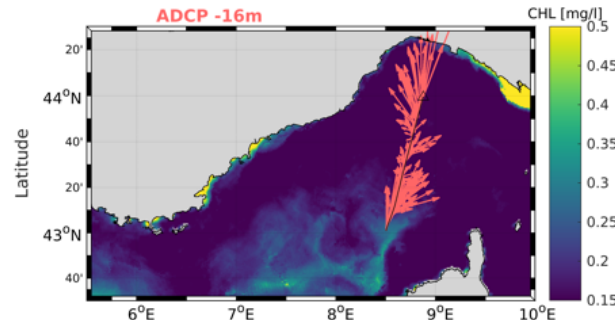
South Currents North



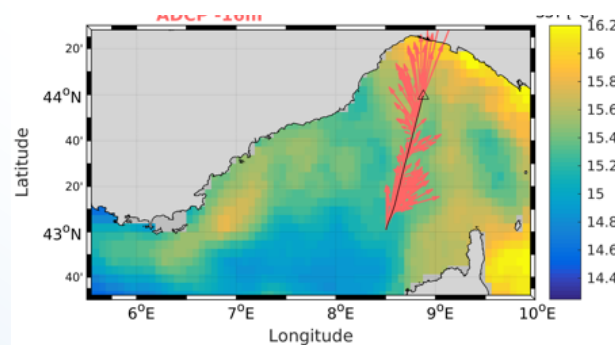
Chlorophyll ACRI L3



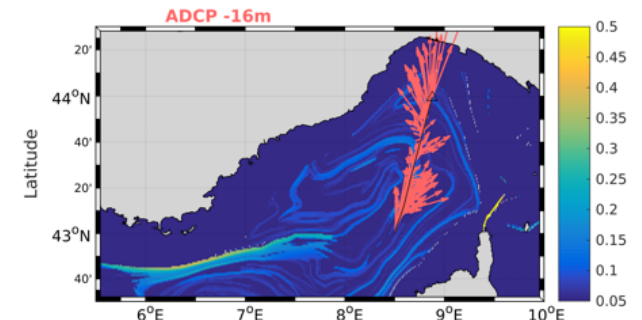
Chlorophyll Medoc L4



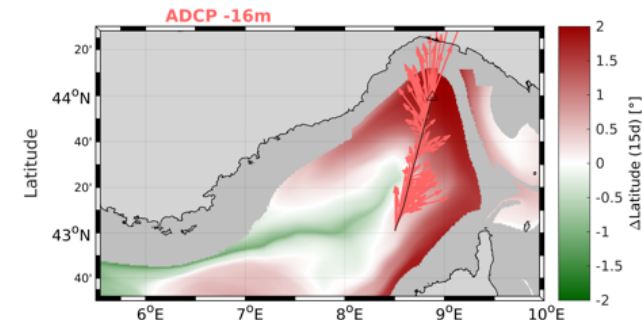
Surface temperature L4



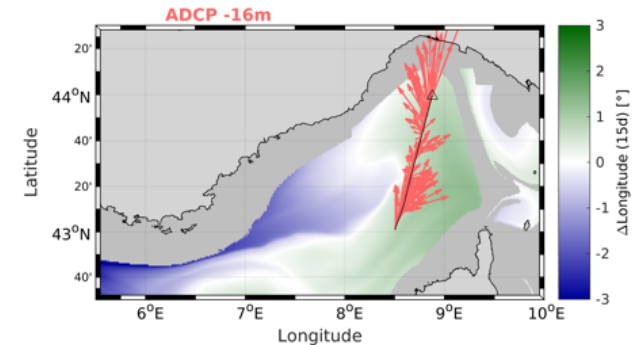
Fronts



Latitude advection



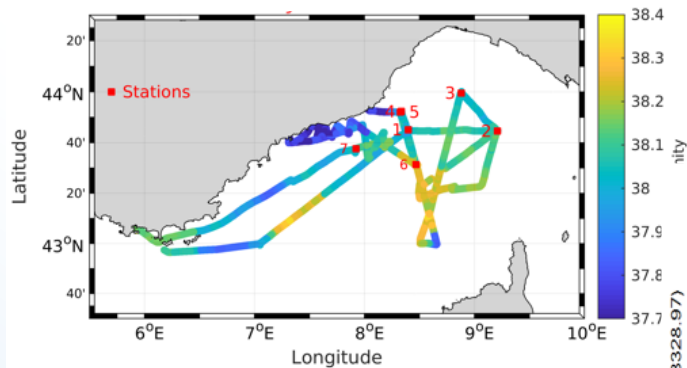
Longitude advection



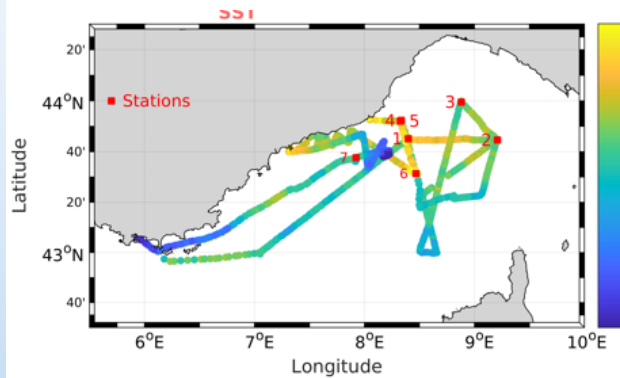
Automated continuous cytometry

Distinction of phytoplankton functional groups

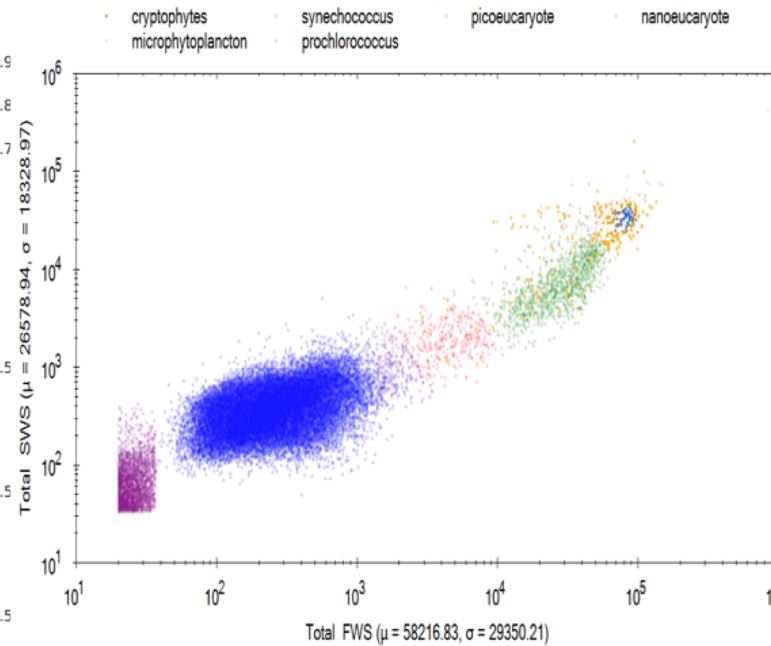
Surface salinity



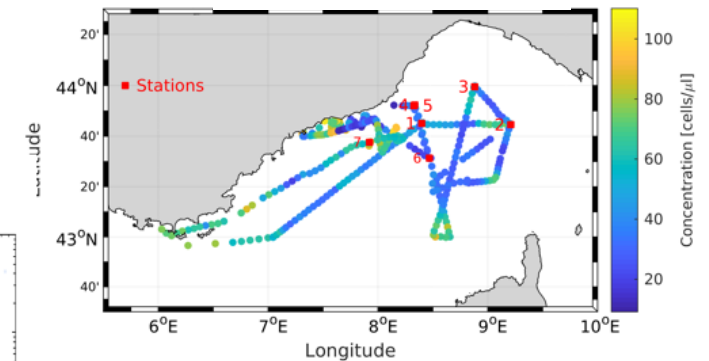
Surface temperature



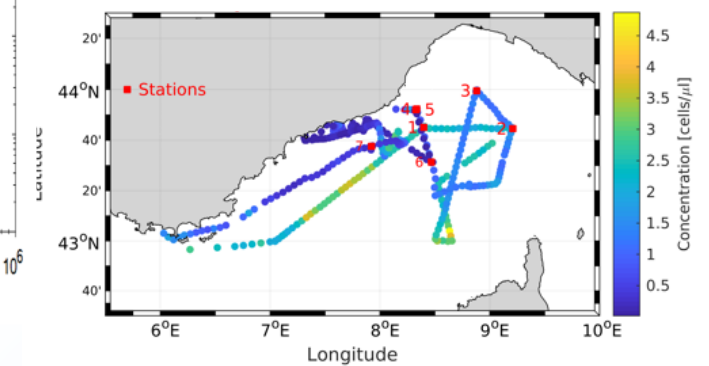
Sample analysis



Synechococcus



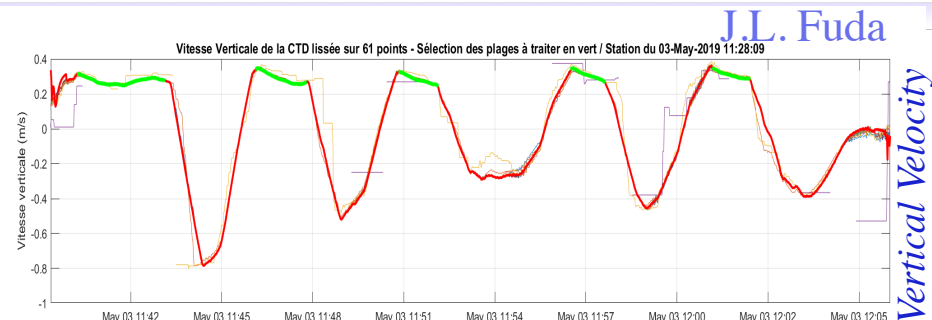
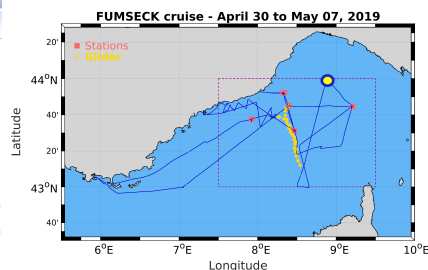
Prochlorococcus





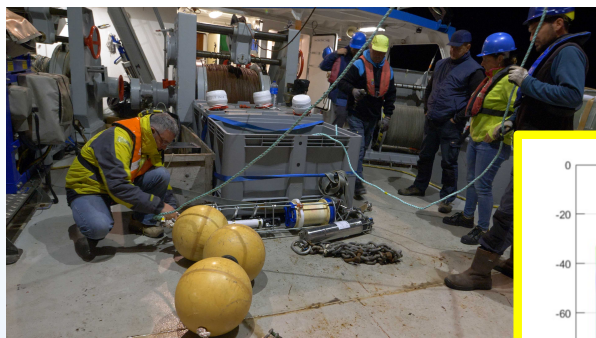
Free-Fall ADCP

- Easy deployment
- Freed from boat movement

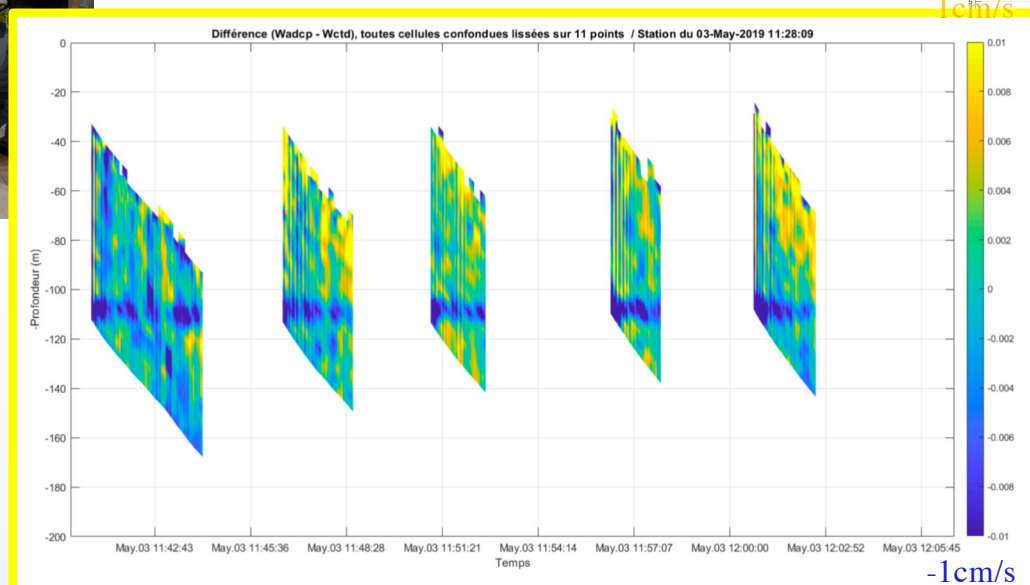


J.L. Fuda

Vertical Velocity

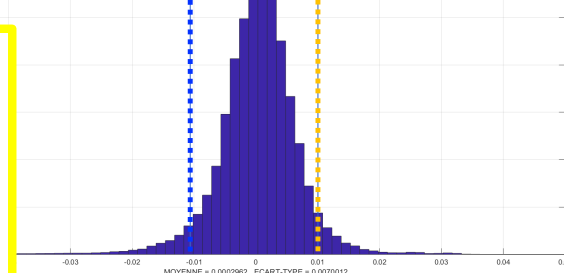


Difference profiles



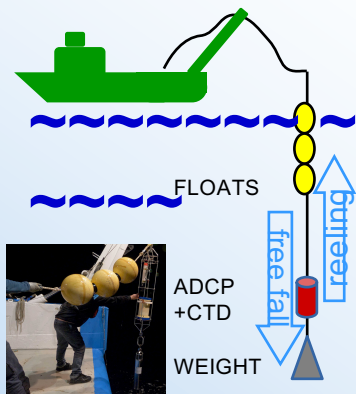
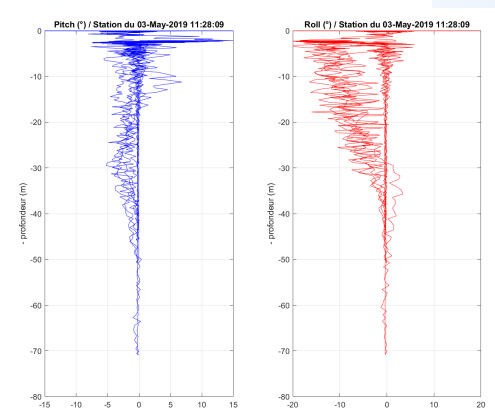
Difference projection

-1cm/s +1cm/s



Pitch

Roll

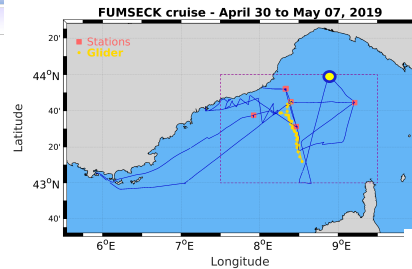


Next : with Sentinel

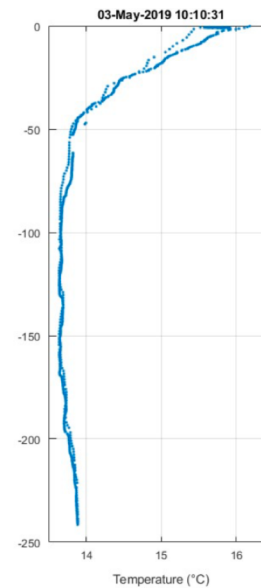


Vertical Velocity Profiler

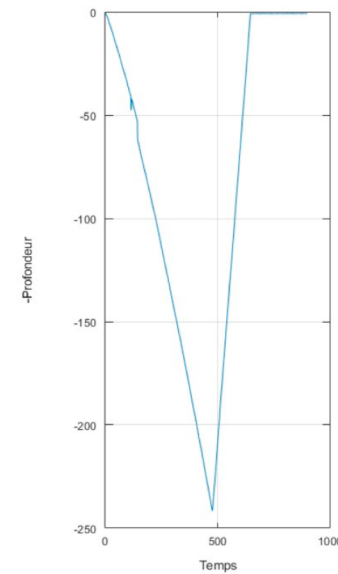
- Free fall
- Tracking with GONIO
- Not easy to retrieve



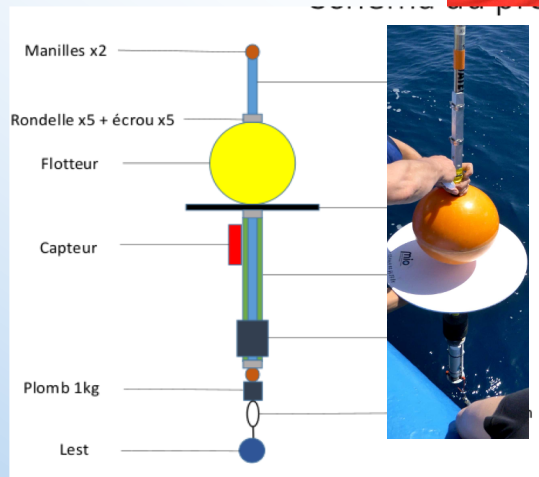
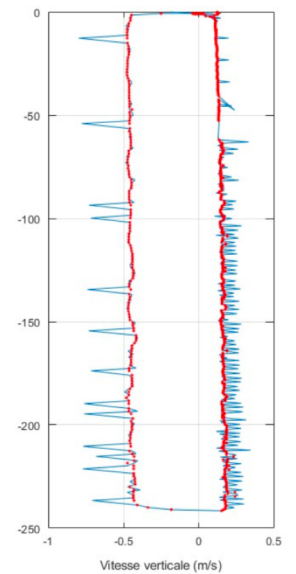
Temperature



Depth



Velocity



Next prototype: multiple profiles, better CTD

FUMSECK and the preparation cruises (OSCAHR, PROTEVS)

-  Innovative **adaptive strategy** with **multidisciplinary** approach
-  → **fine-scale physical structures** drive the **biogeochemical variability** and spatial **distribution of the phytoplankton functional groups**
-  Gained **experience**
-  **Promising** results, in particular for vertical velocity measurement
-  → **deeper understanding** of the physical and biogeochemical processes at the fine scales

SWOT 2022 and the future cruises

-  2D → 3D (increase horizontal and vertical resolution, **access vertical velocities**) → 4D (temporal evolution) for fine scales understanding
-  ...