



Recent progress in the study of fine-scale physical-biological coupling in the Mediterranean Sea.

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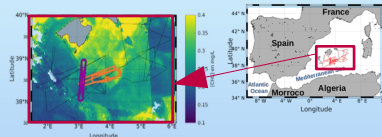
Context

- **Fine scales** : Structures (fronts, eddies) with horizontal scales in order of **10 km to 100 km** with a **short lifetime** (days/weeks).
- Predominantly studied with **numerical simulations** and **satellite observations**.
- Models have highlight the **impact** of fine scales on **biological processes** in particular on the **distribution of phytoplankton**.

Necessity of in situ

Adaptative and Lagrangian strategy

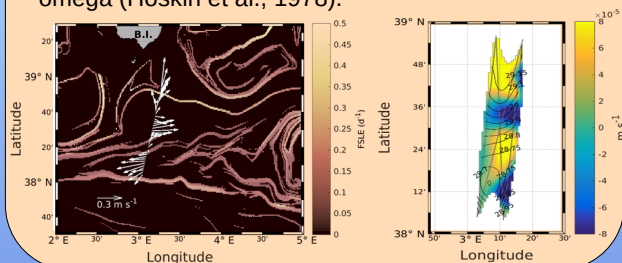
- **PROTEVS MED-SWOT 2018 campaign**.
- Identification of **2 types of water** with different **[Chl]** with **satellite observation**.
- Route of the **ship** across these 2 types of water.
- Sampling at **high spatial** and **temporal resolution**.



Results and conclusion

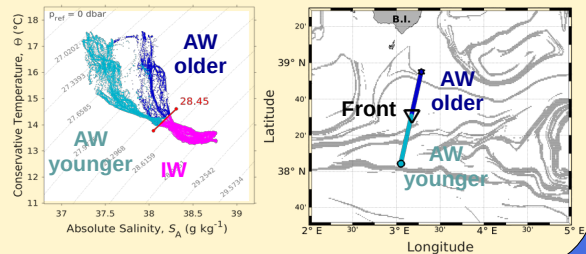
Hydrodynamical

- Identification of a **front** with the **horizontal currents**.
- Estimation of **vertical velocities w** with equation omega (Hoskin et al., 1978).

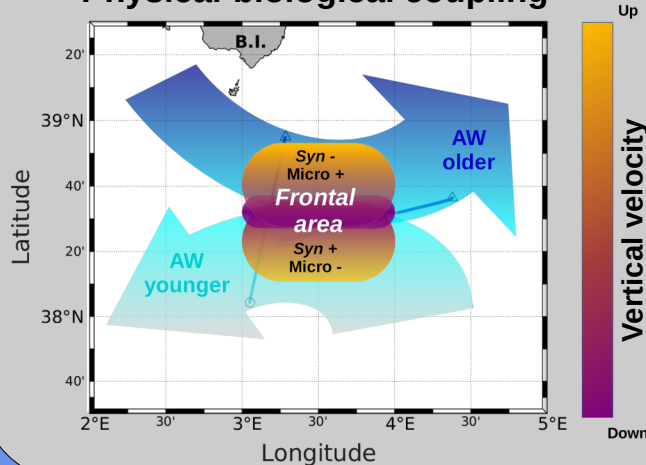


Hydrological

- Identification of 2 types of **Atlantic Water (AW)** at different **stages of mixing** in surface, separated in the frontal area.



Physical-biological coupling

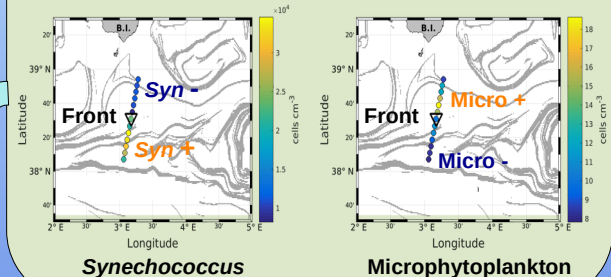


Conclusion

- Impact of the front on the **distribution of phytoplankton**.
- **Barrier role** of the front as described by models.

Biological

- **Abundances of phytoplankton** separated by the front.



Perspectives

- A **new satellite** to better observe fine scale structures in the global ocean : **SWOT 2023**.
- Initiative '**Adopt a SWOT crossover**' : Encourages the international scientific community to coordinate future cruises in the crossover's areas, **before** and **during** the SWOT mission.

