



HAL
open science

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

Roxane Tzortzis, Andrea M. Doglioli, Stéphanie Barrillon, Anne Petrenko, Francesco d'Ovidio, Lloyd Izard, Melilotus Thyssen, Nagib Bhairy, Ananda Pascual, Bàrbara Barceló-Llull, et al.

► To cite this version:

Roxane Tzortzis, Andrea M. Doglioli, Stéphanie Barrillon, Anne Petrenko, Francesco d'Ovidio, et al.. Recent progress in the study of fine-scale physical-biological coupling in the Mediterranean Sea.. EGU General Assembly 2021, Apr 2021, Vienne, Austria. 10.5194/egusphere-egu21-7133 . hal-03375405

HAL Id: hal-03375405

<https://hal.science/hal-03375405>

Submitted on 12 Nov 2021

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

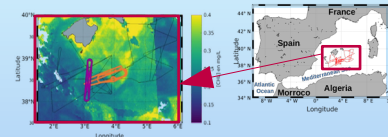
Recent progress in the study of fine-scale physical-biological coupling in the Mediterranean Sea

Context

Adaptative and Lagrangian strategy

- **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**.

- **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**.

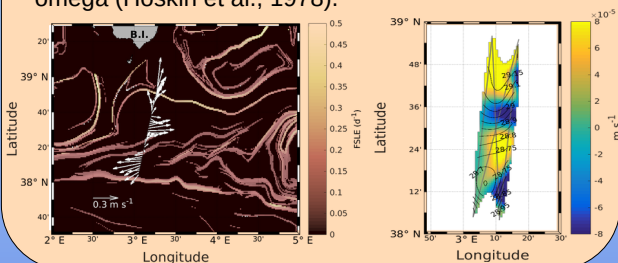


Necessity of in situ

Results and conclusion

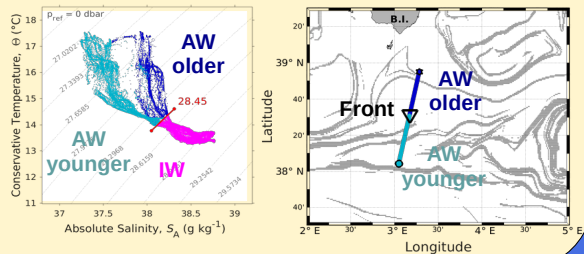
Hydrodynamical

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

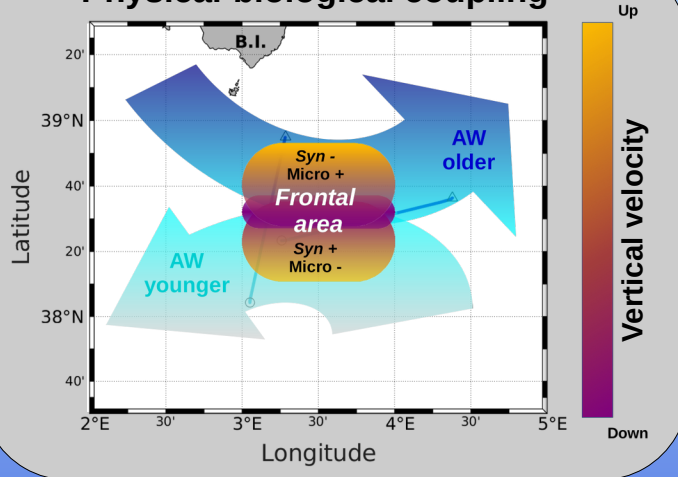


Hydrological

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

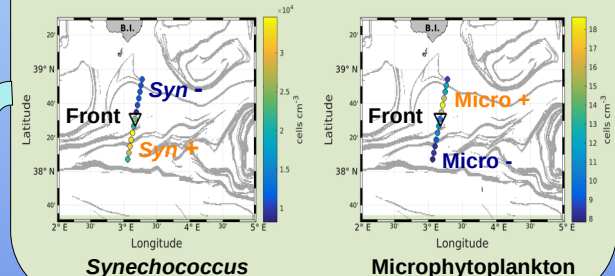


Physical-biological coupling



Biological

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



Conclusion

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

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.

