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

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► To cite this version:

Roxane Tzortzis, Andrea M. Doglioli, Stéphanie Barrillon, A. A 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

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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.

Tzortzis, R., et al.,: Impact of moderate energetic fine-scale dynamics on the phytoplankton community structure in the western Mediterranean Sea, Biogeosciences Discuss. [preprint], <https://doi.org/10.5194/bg-2021-38>, in review, 2021.

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.