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

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mio Mediterranean Institute of Oceanography

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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

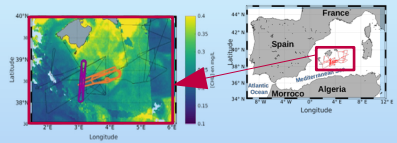
Adaptative and Lagrangian strategy

→ **PROTEVSMED-SWOT 2018 campaign**.

→ Identification of **2 types of water** with different **[Chl]** with **satellite observation**.

→ Route of **the ship** accross these 2 types of water.

→ Sampling at **high spatial** and **temporal resolution**.

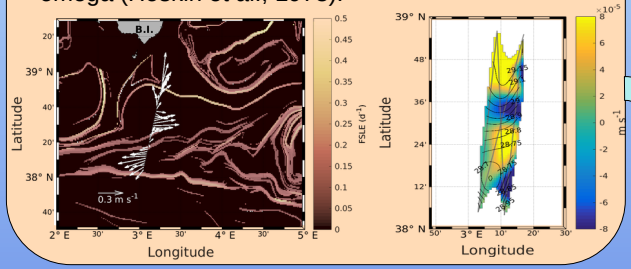


Results and conclusion

Hydrodynamical

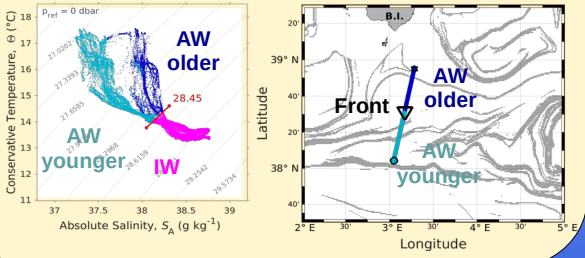
→ Identification of a **front** with the **horizontal currents**.

→ Estimation of **vertical velocities w** with equation omega (Hoskin et al., 1978).

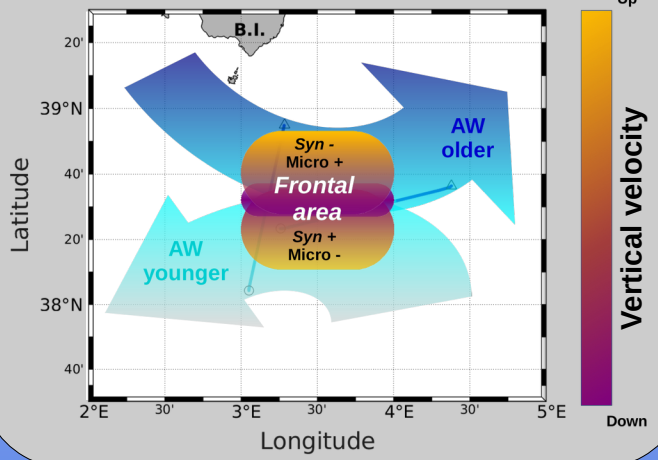


Hydrological

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

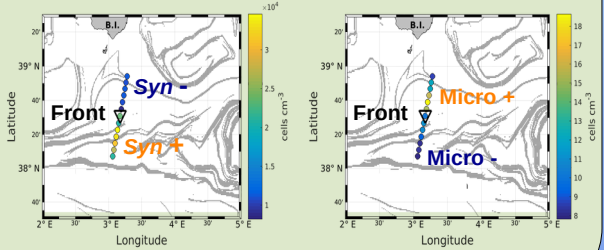


Physical-biological coupling



Biological

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



Synechococcus **Microphytoplankton**

Conclusion

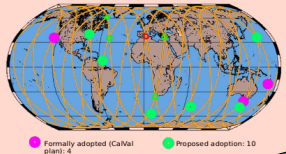
→ Impact of the front on the **distribution of phytoplankton**.

→ **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.



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.