

Combining Bio-Argo Floats with other observing platforms to evaluate the physical-biogeochemical interactions in the North Western Mediterranean Sea

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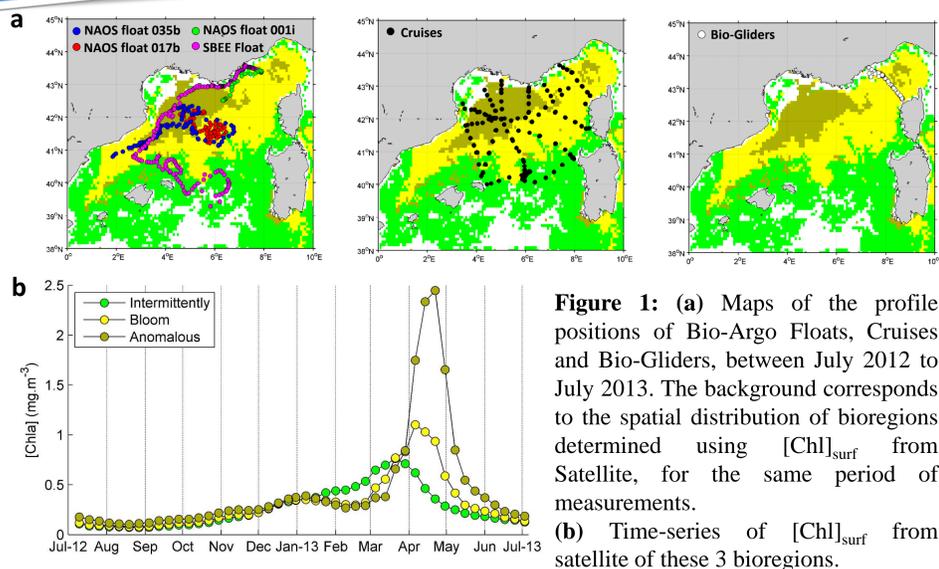
Introduction

- ❖ The North Western Mediterranean (NWM) is the most productive area of the Mediterranean basin (*Bosc et al., 2004*), characterized by a dynamic of temperate seas (*D'Ortenzio and Ribera d'Alcalà, 2009*).
- ❖ Its hydrology is influenced by large deep winter convection events (*MEDOC, 1970*).
- ❖ This specific hydrology is supposed to impact the phytoplankton development (*Herrmann et al., 2013*), by modifying the amplitude and/or the phasing of environmental conditions.

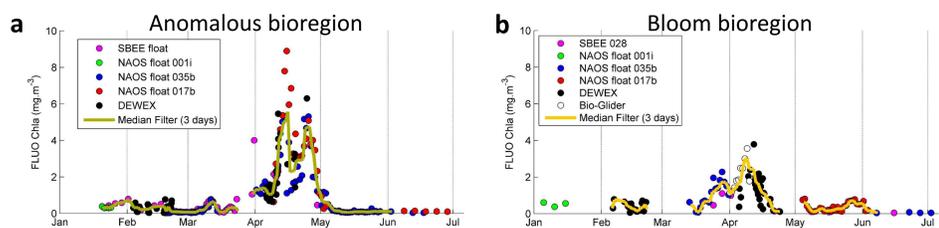
Data and Methods

- ❖ The period of interest is the winter-to-spring transition of 2012/2013.
- ❖ The NWM is divided into bioregions using annual time series of surface chlorophyll concentration ($[Chl]_{surf}$) from Satellite images.
- ❖ Chlorophyll fluorescence profiles (FLUO_{Chl} from autonomous platforms and cruises) are calibrated using HPLC profiles data.
- ❖ A deep convection area is determined using estimations of Mixed Layer Depth (MLD with the 0.01 kg.m⁻³ criteria) from CTD profiles realized in the NWM in winter 2012/2013.

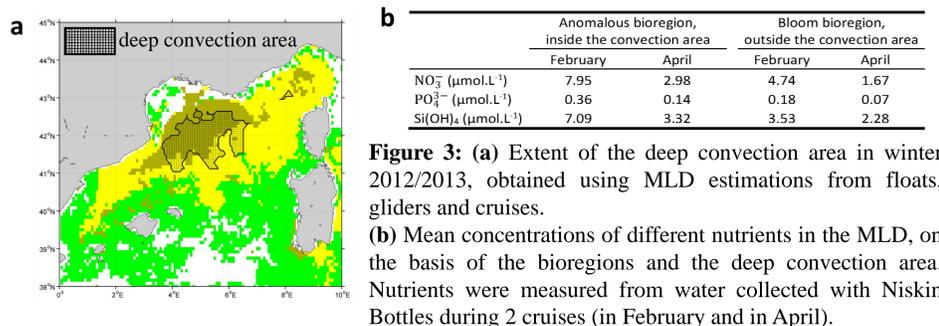
Results



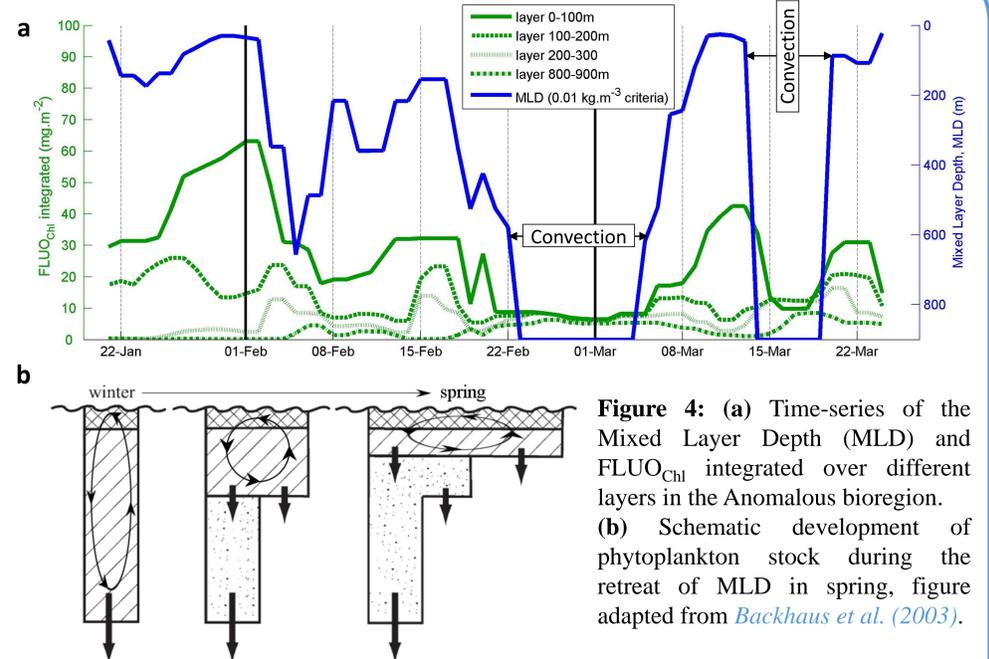
➤ A bioregion with a stronger spring bloom (*i.e.* Anomalous) was detected this year by satellite and well sampled



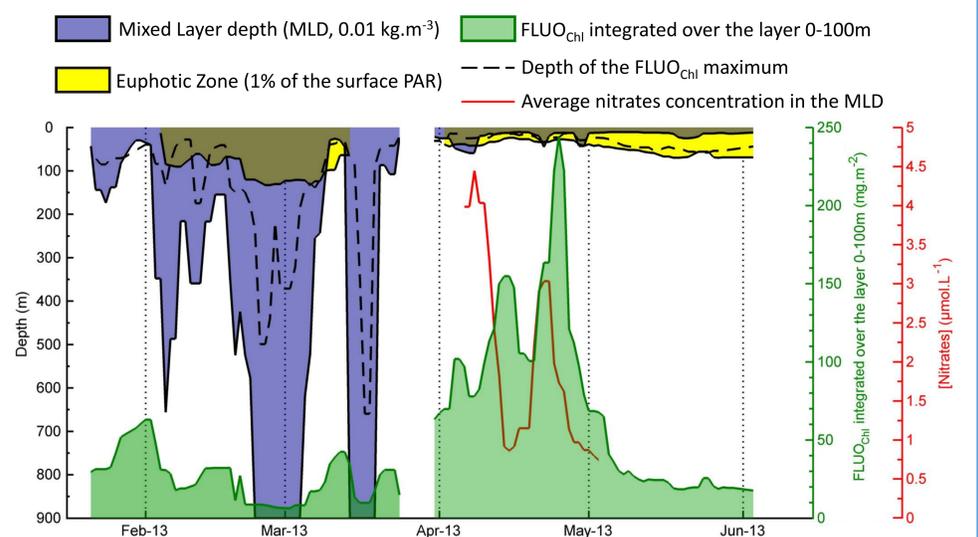
➤ The difference in $[Chl]_{surf}$ between the Anomalous and Bloom bioregions were confirmed by in-situ data



➤ The deep convection area coincided well with the Anomalous bioregion. This could explain the higher nutrient concentrations



➤ The dynamic of phytoplankton stock during the winter-to-spring transition has followed the description of *Backhaus et al. (2003)*



➤ Phytoplankton stock increased rapidly in April and was firstly limited by nutrients, which were re-injected in mid-April

Conclusion

- The deep convection event impacted the phytoplankton development, the nutrient concentration and stoichiometry
- Non-null values of phytoplankton concentration during convection periods could impact carbon export in late winter/early spring
- Short deepening events of the MLD in spring could weaken nutrient limitation

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