



Particulate concentration and seasonal dynamics in the mesopelagic ocean based on the backscattering coefficient measured with Biogeochemical-Argo floats

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Analysis of high frequency optical backscattering and Chla fluorescence data obtained from BGC-Argo floats at the base of the mesopelagic zone.

Antoine Poteau¹, Emmanuel Boss², Hervé Claustre¹, Nathan Briggs¹, Alex Mignot¹

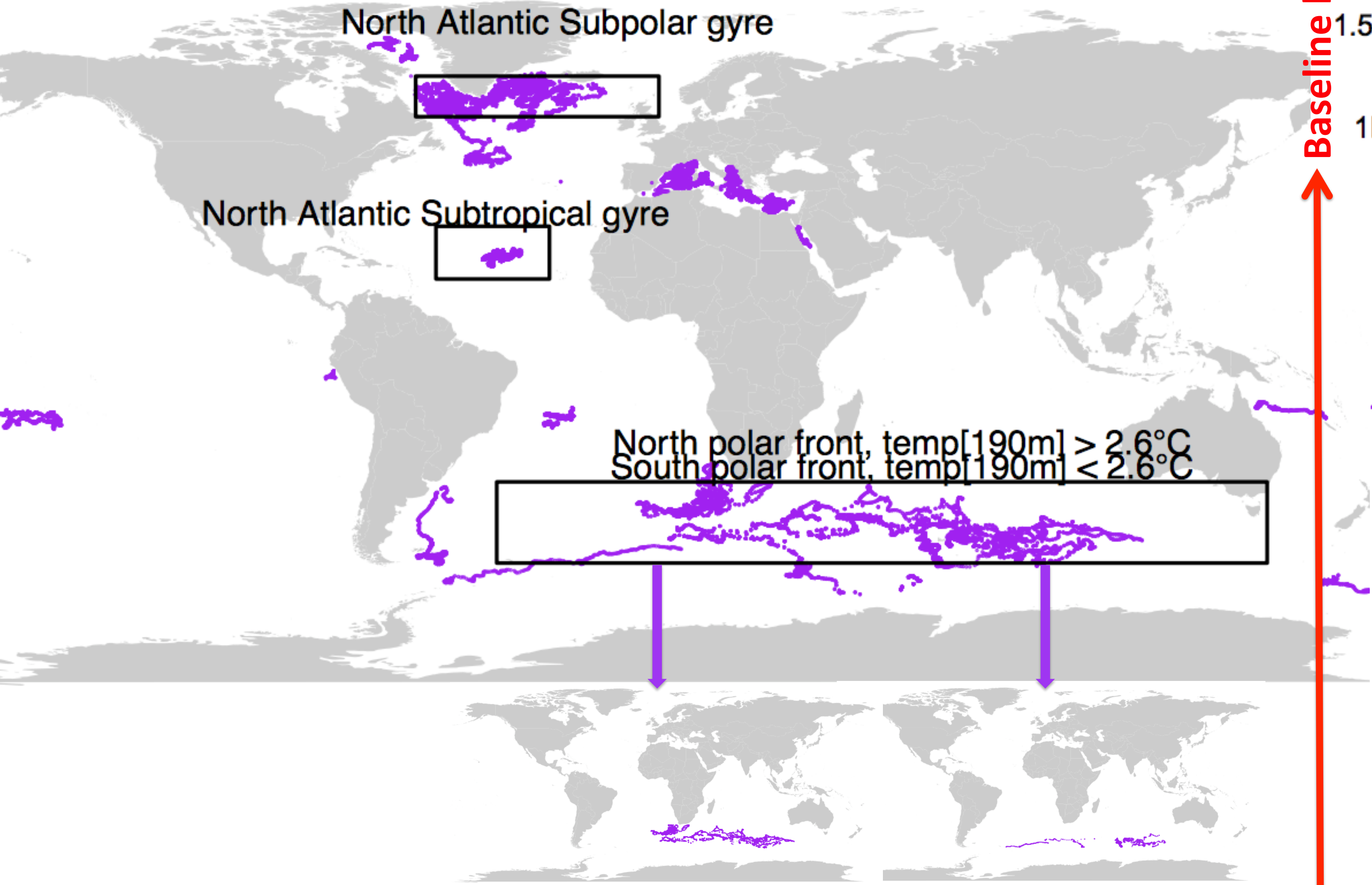
1: Sorbonne Universités, UPMC Univ Paris 06, INSU-CNRS, Laboratoire d'Océanographie de Villefranche 2: University of Maine



Besides measuring vertical profiles of optical proxies (Chla fluorensence, backscattering) certain BGC-Argo floats can be configured to record time series of these proxies during the so-called parking depth (generally at 1000m). We present here the first analysis of 5 year of such time series (up to 10 min sampling interval), acquired in various open ocean provinces representative of the diversity of biogeochemical conditions of the global ocean. The main objective is to resolve and identify potential event of **particulate matter export** and to possibly relate them to sub-surface processes. We further evaluate if some more qualitative information (**freshness of the export material**, size proxies) can be resolved from the analysis of those signals.

Source of data : Argo GDAC with expert supervised data control.
Measurements of particulate backscattering coefficients (b_{bp}) at 700nm and Chl_a fluorescence acquired during the parking depth.

- minimum of 24 acquisitions/day/float
- between 900m and 1100m



North polar front, temp[190m] > 2.6°C
South polar front, temp[190m] < 2.6°C

aggregate event : b_{bp} and no Chl_a

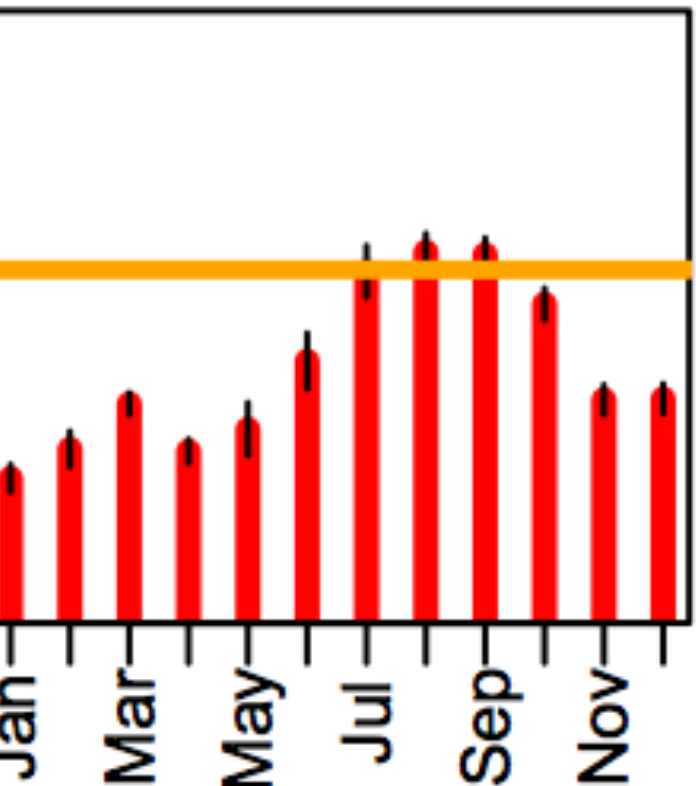
aggregate event : b_{bp} and chl_a

median(b_{bp}) + 5(standard deviation of b_{bp})

$$N = \text{number_event} \quad M = \text{total_aquisitions}$$
$$\text{proxy_event} = (\sum N) / M$$
$$\text{prox_flux} = (\sum b_{bp}(N) - \overline{bbp}) / M$$

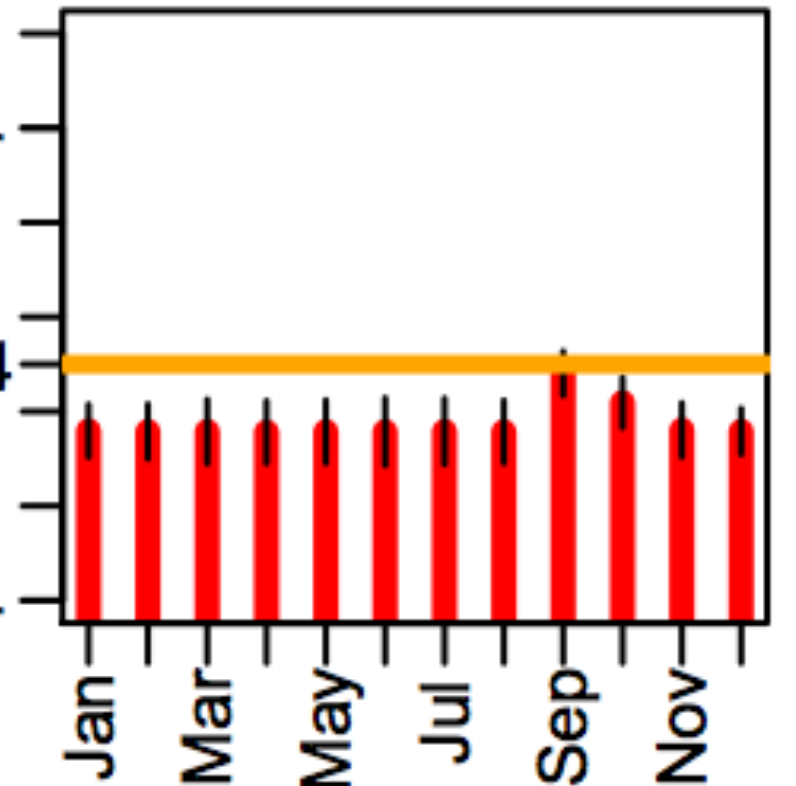
	North Atl. Subpolar gyre	North Atl. Subtropical gyre	North polar front	South polar front
Number of acquisitions	210373 27582/1693	49939 7675/0	179477 10883/1178	61577 6224/569
Number of days	9980 1260/79	2540 346/0	8542 500/60	2849 281/26
Number of floats	20 19/9	3 2/0	16 14/8	9 6/4

North Atlantic
Subpolar gyre

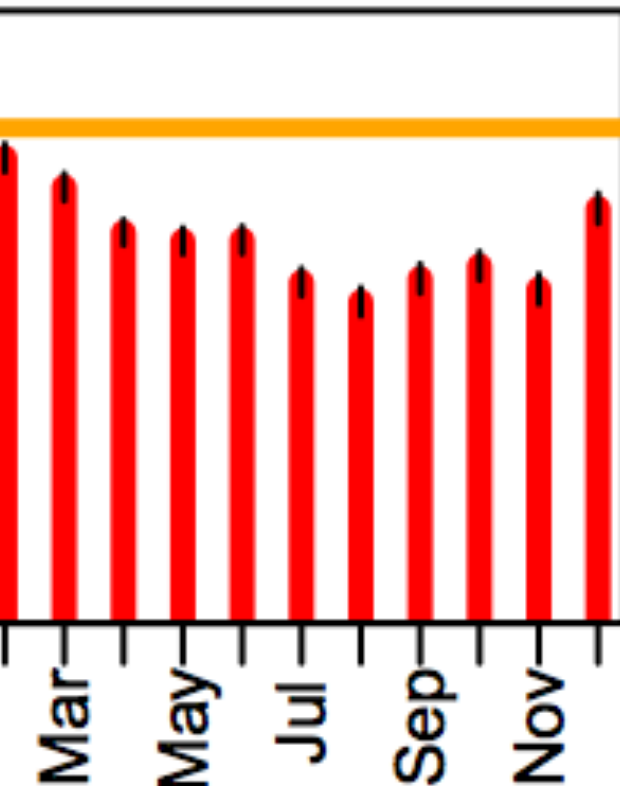


→ the median of b_{bp} 700 at the mesopelagic zone is consistent with the results of Poteau et al. (2017) (orange line)

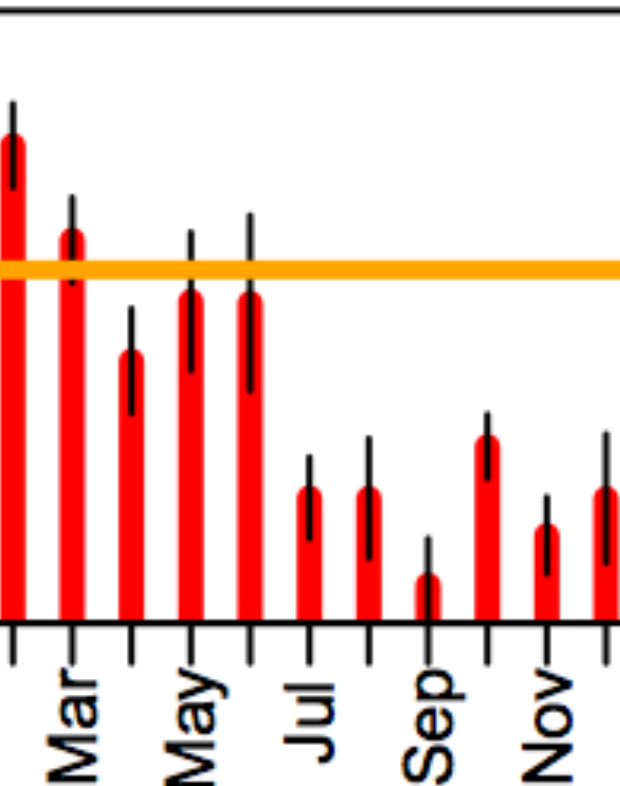
North Atlantic
Subtropical gyre



North polar
front



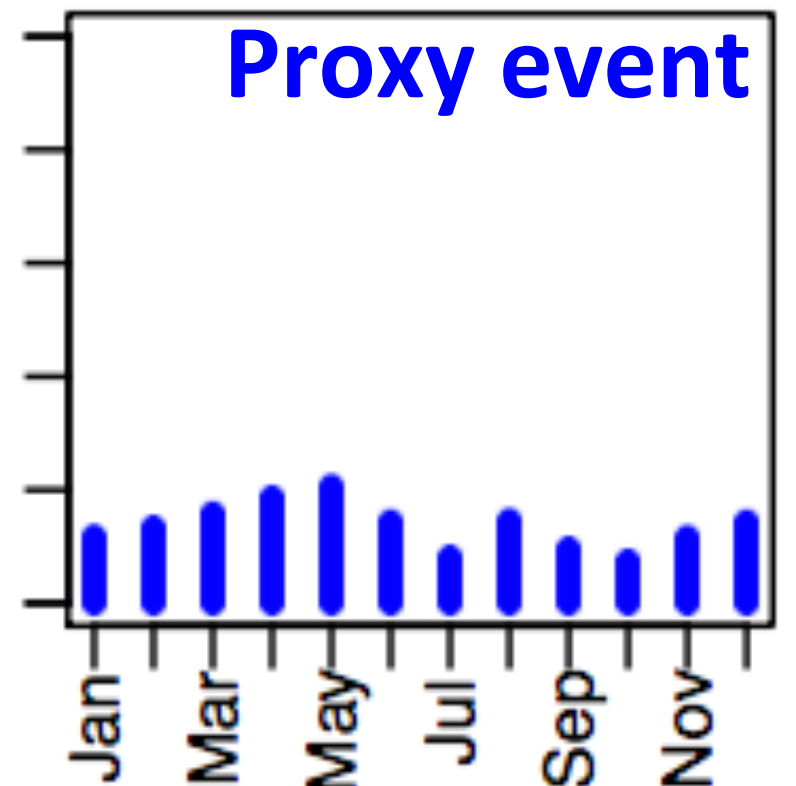
South polar
front



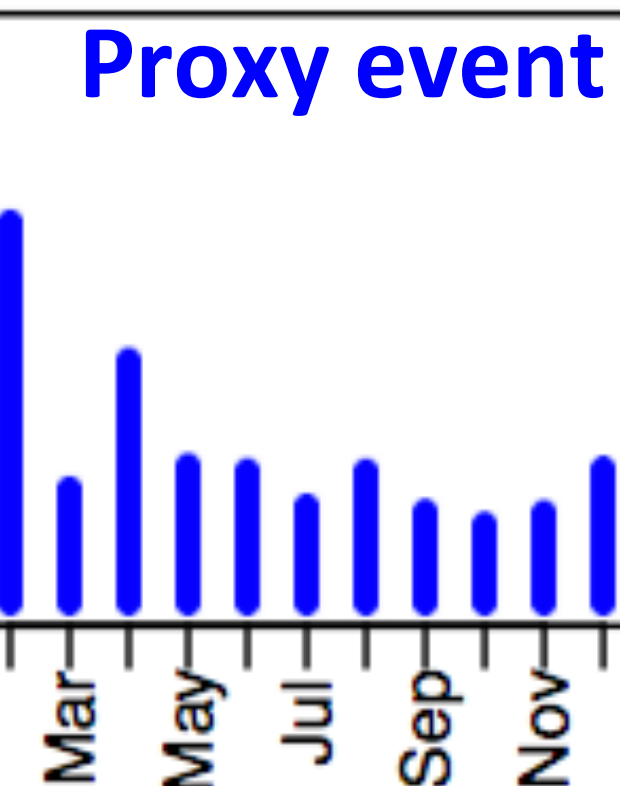
North Atlantic
Subpolar gyre



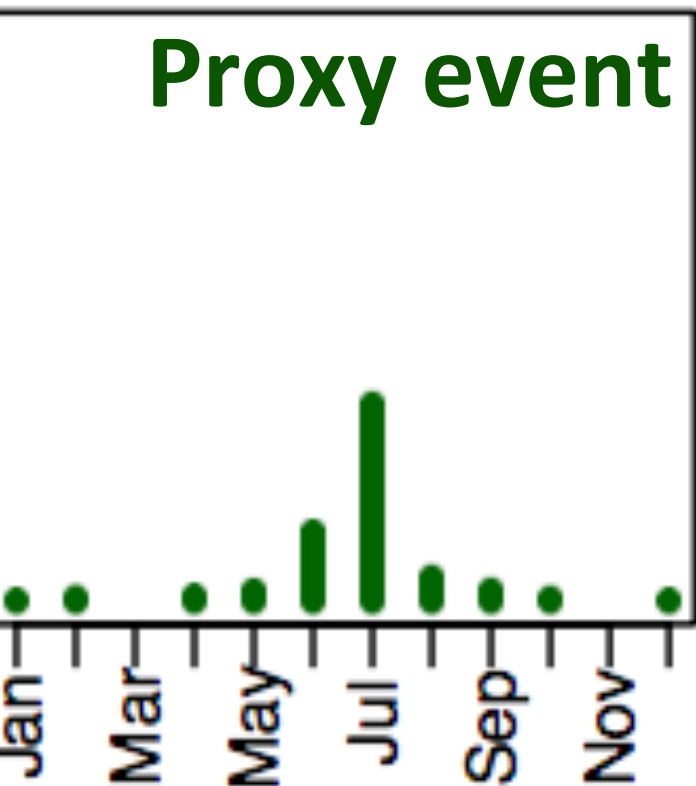
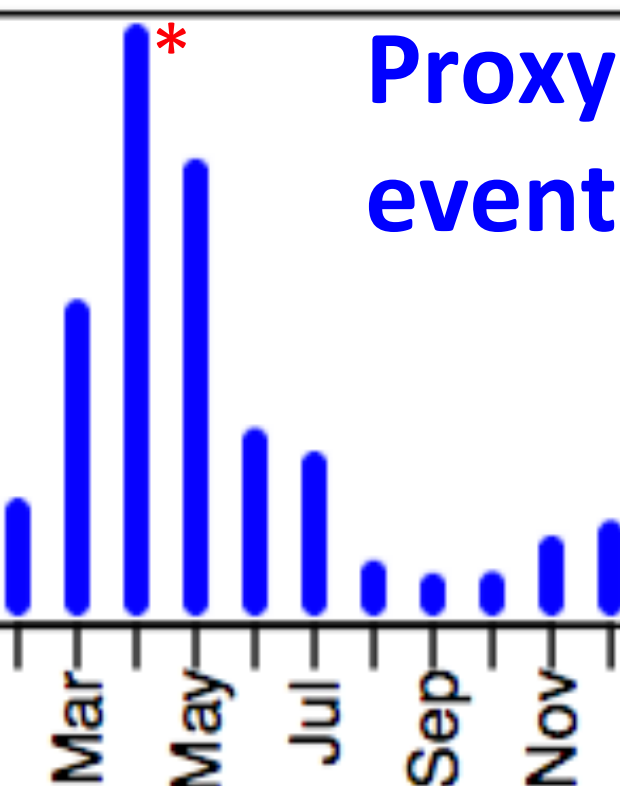
North Atlantic
Subtropical gyre



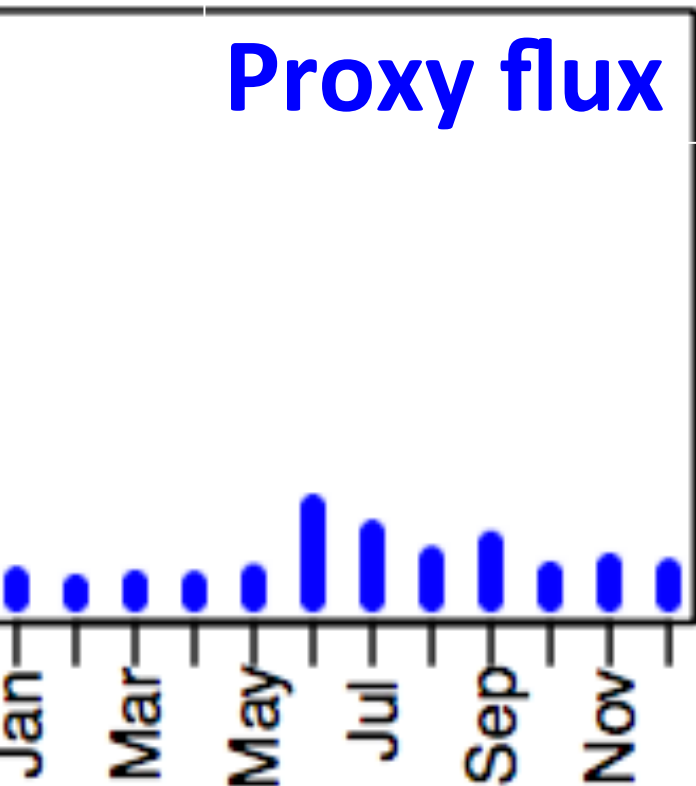
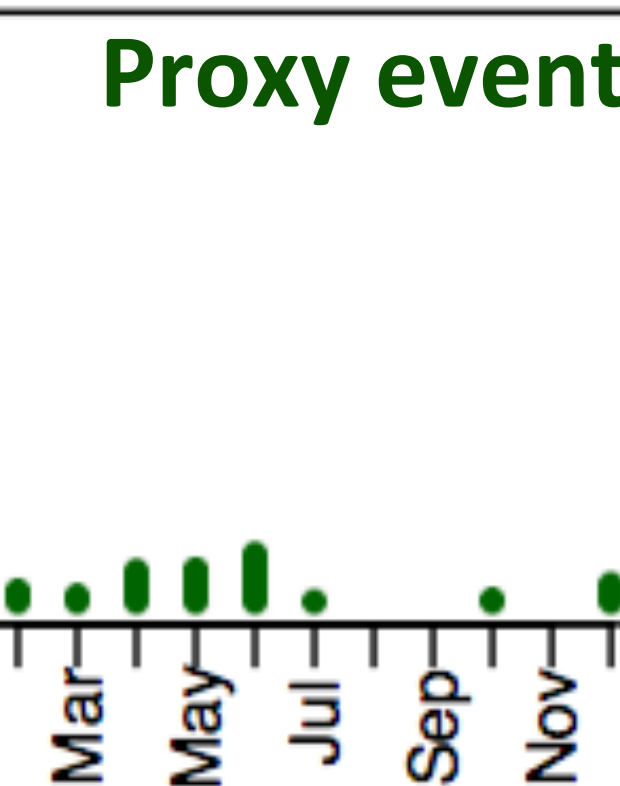
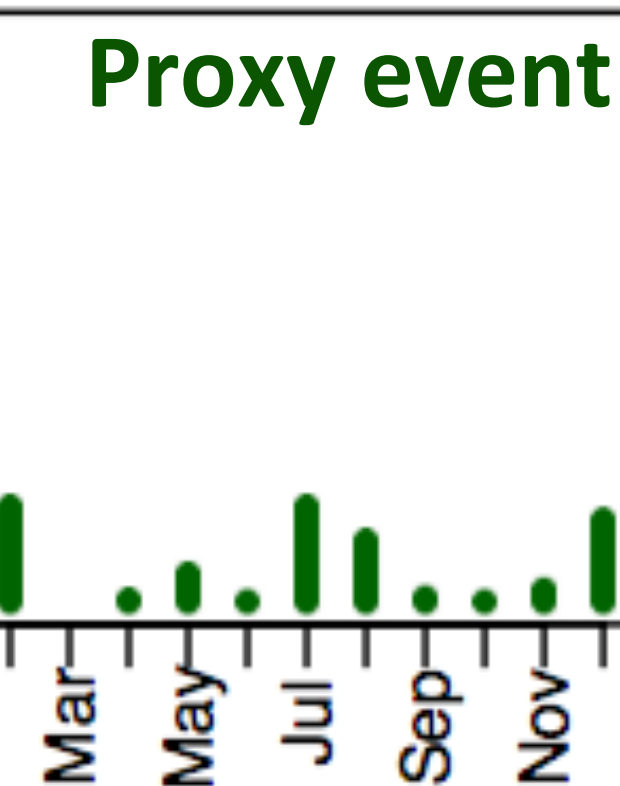
North polar
front



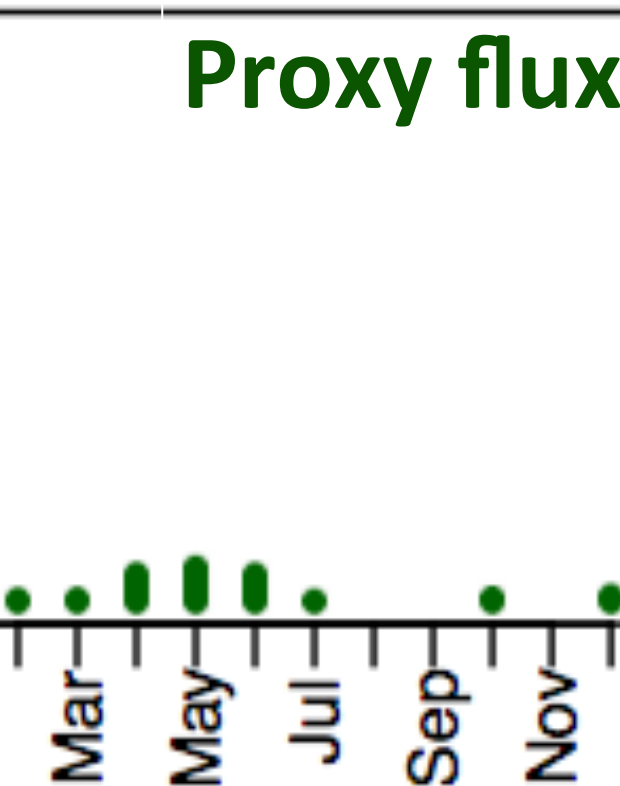
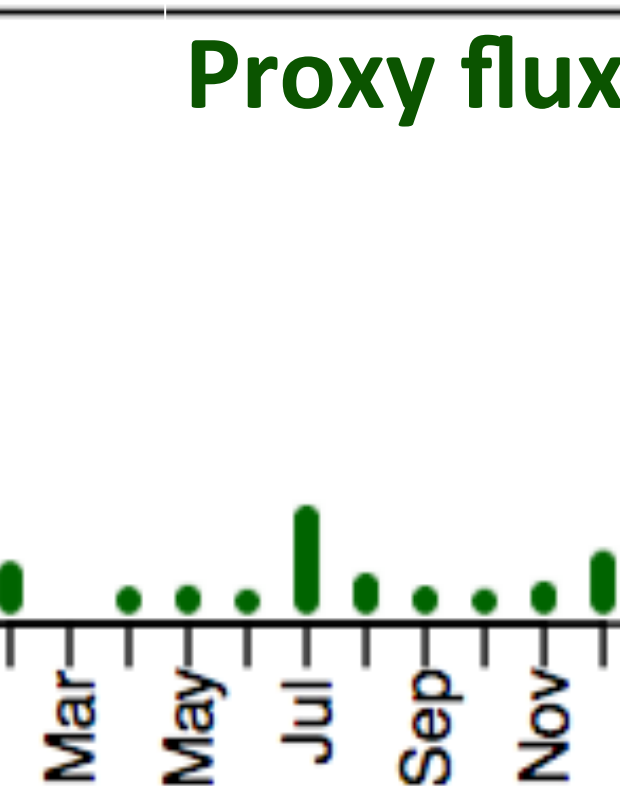
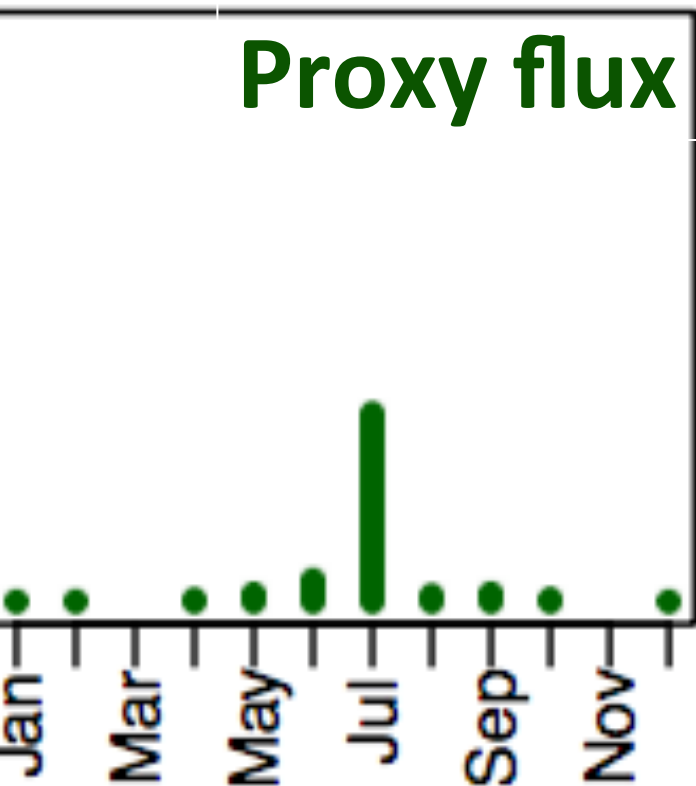
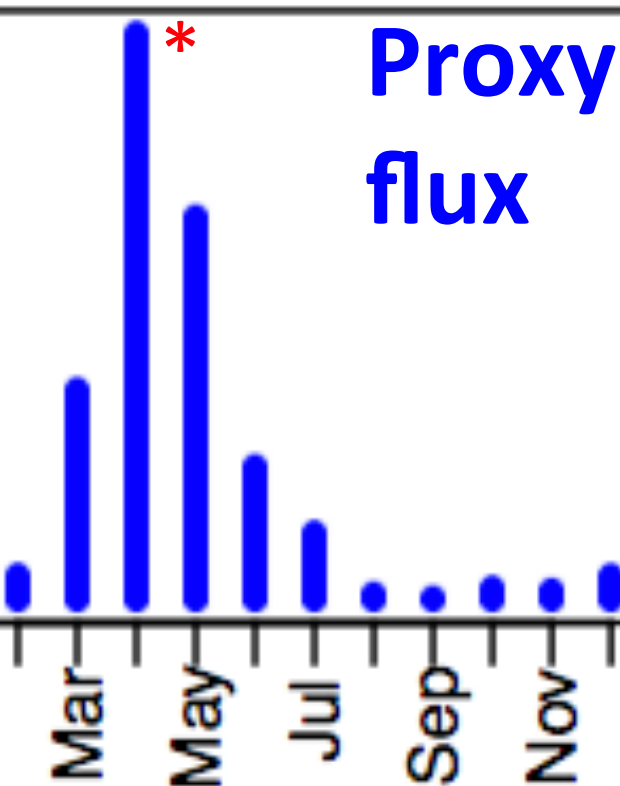
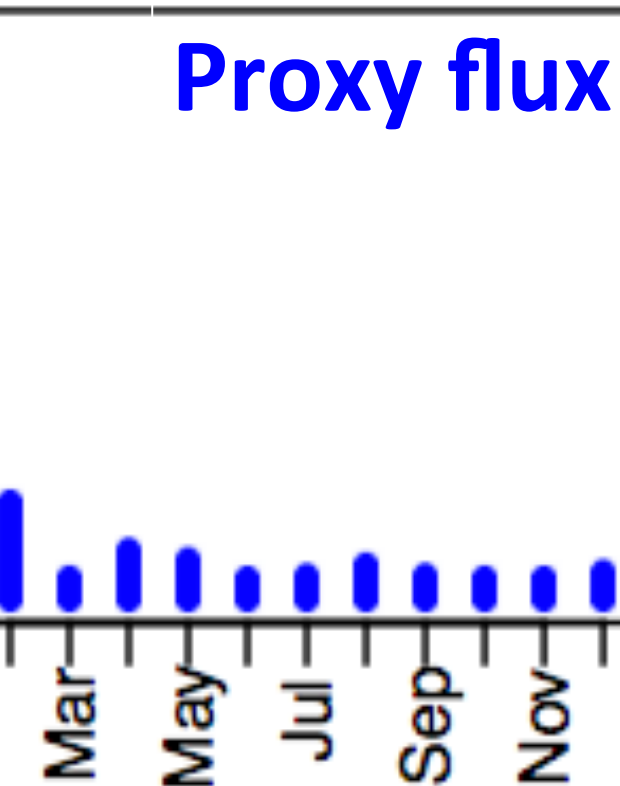
South polar
front



No proxy event



No proxy flux



PRELIMINARY ANALYSIS

- **North Atlantic Subtropical gyre**: the lowest values of proxy events and flux.
- **North Atlantic Subpolar gyre and North polar front**: similar trends highest values of proxies recorded during the bloom period.
- **South polar front**: the highest values of proxy events compared to the other areas. the highest values of proxies are delayed by 3 months after the bloom.

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Reference: Poteau, A., E. Boss, and H. Claustre (2017), Particulate concentration and seasonal dynamics in the mesopelagic ocean based on the backscattering coefficient measured with Biogeochemical-Argo floats, *Geophys. Res. Lett.*, 44, doi:10.1002/2017GL073949.