

Interactive comment on “Sub meso scale phytoplankton distribution in the north east Atlantic surface waters determined with an automated flow cytometer” by M. Thyssen et al.

Anonymous Referee #2

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The authors frequently examined phytoplankton distributions in surface waters in the NE Atlantic using a Cytosub flow cytometer. As a result, they found that the phytoplankton distributions could be affected by their cellular cycles. The data obtained in this study are novel, and the paper is mostly well written. However, I found a few ambiguous points on their data interpretations:

1) It is well known that cellular chlorophyll fluorescence (i.e. FLR) can be changed with light intensity. Such light acclimation (non-photochemical quenching) for phytoplankton photosynthesis has shorter time-scale than their cell cycles. However, the authors did not show irradiance data nor discuss on the effect of light intensity on the tempo-spatial

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variations of FLR and FLR/FWS ratios during the cruise. If light intensity is not a major controlling factor for the meso-scale variability in FLR, please indicate the reason(s). Perhaps the ability of light acclimation differs among each cluster (C1-C6).

2) In Table 3 and Fig. 8, the r_1 and r_2 values seems to be generally low, but the authors did not show any significance levels on the statistics. Please indicate them in Table 3.

My minor comments are described below.

P. 2474, lines 16-17: "which would have been critical to interpret otherwise" is not clear for me.

P. 2474, lines 27: "FlowcontTM" should be changed to "Flow-CountTM".

P. 2476, line 7: Insert "and" between "length" and "apparent size".

P. 2477, line 2: Insert "and" between "PO₃₋₄" and "Si(OH)₄".

P. 2477, line 12: "between the 14 April and the 25 April" should be changed to "between 14-25 April".

P. 2477, line 25: "low mixed layer depth" should be changed to "shallow mixed layer depth".

P. 2478, line 10: " μm " should be changed to " μM ".

P. 2478, line 10: "The highest concentrations" should be changed to "The higher concentrations".

P. 2478, line 12: " μm " should be changed to " μM ".

P. 2478, line 12: "The highest concentrations" should be changed to "The higher concentrations".

P. 2478, lines 16: " μm " should be changed to " μM ".

P. 2478, lines 5-6. How did you estimate MLD in M0 without in situ temperature and

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salinity data? Are the estimates of the MERCATOR model applicable to this study with high precision? At least, please verify the outputs from the model with in situ data between M1 and M4.

P. 2478, line 16: " μm " should be changed to " μM ".

P. 2478, line 18: Remove "salinity" from the sentence, because no diel oscillation in salinity was observed (P. 2477, line 22).

P. 2478, line 19: " $\text{Si}(\text{OH})_4$ " should be changed to " $\text{Si}(\text{OH})_4$ ".

P. 2479, lines 13-14. I cannot follow the statement "FWS and FLR of C2 cells exhibited a decrease through M0", because increases in these parameters for C2 were obvious.

P. 2479, lines 14-15: The sentence "FLR kept decreasing between M1 and the end of the transect (near 5°W)" is also incomprehensible, because FLR for C2 was highly variable between M1 and M3, and the decrease trend the authors pointed out seemed to be statistically insignificant.

P. 2480, lines 2-3. Why didn't you show the statistical analyses of C2, C4, C5 and C6 in Fig. 8?

P. 2480, line 6: "illustrate" should be changed to "illustrates".

P. 2482, lines 21-22: The average cell size in the observed clusters ranged from less than $<1 \mu\text{m}$ up to $50 \mu\text{m}$. The "less than" or " $<$ " should be removed. This sentence seems to contradict the description "The Cytosub was designed to analyse large phytoplanktonic cells (P. 2475, line 4)". Can the Cytosub measure tiny algal cells ($< 1 \mu\text{m}$) such as *Prochlorococcus* with high accuracy?

P. 2487, line 29-P. 2488, line 2: Why do you think that C6 could be coccolithophores? Do you have any support data on its identification? If not, you should delete the sentence.

Figs. 1, 2, 3, 5, 6, and 7: The unit of x-axis should be changed from "E" to "W", as is

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the text.

Figs. 2, 3, 4, 5, 6, 7, and 8: The A, B, C, D, E, and F should be changed to (a), (b), (c), (d), (e) and (F), respectively.

Figs. 8(a) and 8(b): The unit of x-axis should be changed from date to longitude (W), as is the other figures.

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