

## ***Interactive comment on “Coccolithophore fluxes in the open tropical North Atlantic: influence of the Amazon river and of Saharan dust deposition” by Catarina V. Guerreiro et al.***

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The authors are most grateful to Alex Poulton for his overall positive feedback on our manuscript, and for the helpful specific comments, which will be all taken into account for the new updated version of the paper.

Reply to specific comments of Alex Poulton:

AP: Pg 6, Ln 14-16: Please note that the variability in incidental PAR levels at the two sites (range from 65.59 to 65.62 E m<sup>-2</sup> d<sup>-1</sup>) is fairly minimal (±0.03 E m<sup>-2</sup> d<sup>-1</sup>) and this should be mentioned in the text (despite the clear seasonality shown in Fig. 2).

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CG: This part will be updated to: “Despite of the narrow range of PAR values observed at both stations, a clear seasonal trend is evidenced from slightly higher PAR during spring and summer (up to 65.615 Einstein m<sup>-2</sup> d<sup>-1</sup> in April 2013) and slightly lower PAR during fall and winter (down to 65.588 Einstein m<sup>-2</sup> d<sup>-1</sup> in December 2012) at both stations (Fig. 2cd) “

AP: Table 4: Please clarify the ‘numbers’ referred to in the table legend, e.g. “in Factor 3, numbers 7 and 12 indicate ..”.

CG: For clarification, the sample-numbers of the three pulsed flux events will be indicated in the plots of *E. huxleyi*, *G. oceanica* and *G. muellerae* from Figure 6, and properly explained in the caption of the figure. Regarding the caption of Table 4, it will be updated to: “In Factor 3, numbers 7 and 12 indicate the sample reference for the time-intervals where *G. muellerae* and *E. huxleyi* produced “pulse-like” maxima at station M4 (i.e. late January and middle April, 2013, respectively) (see Fig. 6i,c), whereas in Factor 4, number 24 indicates the sample reference for the time-intervals where the “pulse-like” maxima of sea surface Chl-a and *G. oceanica*, together with a sharp increase of *E. huxleyi* occurred at station M4 (i.e. late October/early November 2013) (see Fig. 6c,j).“

AP: Pg 16, Ln 6: Please clarify ‘Own SEM observations . . .

CG: We meant that during the SEM counting of coccoliths throughout sample M4-24, we have found (as referred in the text) extremely high amounts of large fragments of diatoms. Below you may see one of the pictures I took from the sample to illustrate this aspect. This will be written in a clearer way in the updated version of the manuscript.

Pg 18, Ln 22-23: Consider rephrasing “In contrast, during spring, not only the Amazon was not yet present in the study area, but the nearly inexistent precipitation possibly resulted in . . .” - numerous negatives statements becomes a bit confusing.

CG: This will be updated to: “In contrast, the Amazon plume was not yet present in

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the study area during spring and the nearly inexistent precipitation possibly resulted in comparably lower nutrient-bioavailability by dry dust deposition (see Ridame et al., 2014).”

AP: Pg 18, Ln 27 (and elsewhere): Consider including an explanation of K-/r-selected ecological strategies somewhere in the text for clarity.

CG: We will follow the recommendation of the referee by including a short definition of these terms in the introduction, pp. 2 line 30: “Coccolithophores are amongst the most important phytoplankton groups within open-ocean, stratified-oligotrophic waters (e.g. Winter et al., 1994), hence displaying features more typical of K-selected taxa (Margalef, 1978). These so called “K-selected species” are better adapted to compete successfully for limited nutrient availability in more stable environments, such as tropical regions and subtropical gyres, presenting low maximum growth rates and fairly constant populations that are in equilibrium with the environmental resources (see Margalef, 1978). Still, coccolithophores also include more opportunistic (r- selected) taxa that quickly respond to short-term changes associated with nutrient input (e.g. Guerreiro et al., 2013). These so-called “r-selected species” are recognized for their ability to reproduce quickly in unstable conditions, being often characterized for higher maximum growth rates and well adapted to survive and flourish within nutrient-rich and turbulent coastal environments.

AP: Pg 18, Ln 30-30: Unnecessary repetition of ‘recently’ in same sentence and *Trichodesmium* should be italicised (*Trichodesmium*).

CG: This will be updated to: “High fluxes of organic material recently observed in a sediment trap in the North Atlantic subtropical gyre (23°N 41°W) have been associated to enhanced phytoplankton productivity resulting from stimulated nitrogen fixation by *Trichodesmium* species following the deposition of dust-derived nutrients (Pabortsava et al., 2017).”

AP: Pg 18, Ln 34: Correct spelling of Falkowsky to Falkowski (et al., 1998).

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CG: This will be properly corrected.

AP: Pg 18, Ln 39: Please explain meaning of LNLC (low-nutrient-low-chlorophyll) areas.

CG: This will be updated to: “(..) on the other hand, report on the importance of strong and short-term (“pulse-like”) dust deposition events on marine productivity in Low Nutrient Low Chlorophyll (LNLC) areas (..)”

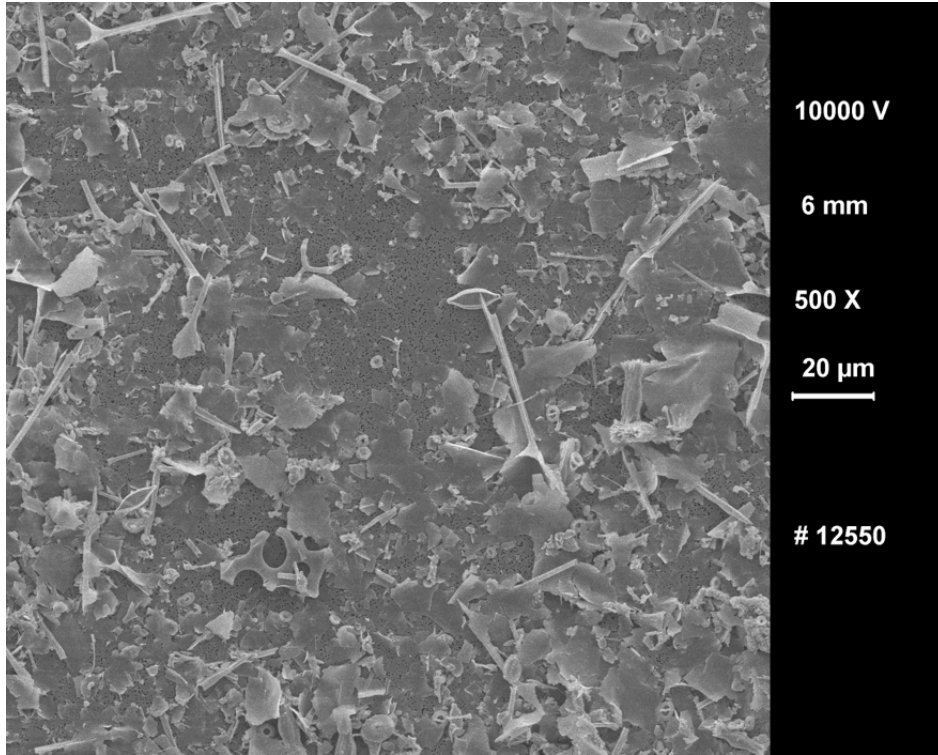
AP: References: Couple of minor errors noticed, should all be checked. Those noticed are: Jickells et al. 2005. Please correct title. Margalef 1978 – not cited?

CG: All the references will be checked including the ones referred by Alex Poulton, and Margalef (1978) will be added to the list of references.

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**Fig. 1.** Sample M4-U24 enriched with large fragments of diatoms

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