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Biogeosciences Discussions

# *Interactive comment on* "Main drivers of transparent exopolymer particle distribution across the surface Atlantic Ocean" *by* Marina Zamanillo et al.

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This is a good manuscript that provides excellent summary of TEP information. A good synthesis of data at hand despite the limitations of coverage in space (data collected only at 4m and at times the discussion is based on 1 sample to represent a hydrographic domain, say CU). The authors made the point that TEP contributes majorly to POC than phytos and HP based on the quantification of TEP, phytos and HP carbon pools estimated from available conversion factors. That the authors are well aware of limitations/approximations of these conversion factors, semi-quantitative nature estimations of TEP, phytos and HP pools (the last two are based on cell numbers) one



would have expected the authors to critically evaluate their % contributions keeping the associated overall errors (methodology+conversion). This may not alter their conclusions but convinces the readers with appropriate comparisons having taken errors into account. I recommend minor revision of this manuscript before it is accepted for publication. 1. Lines 65-66: 'Enhancing particle sinking' – The authors may want to see open ocean TEP information from North Indian Ocean (Kumar et al., 1998) 2. Line 67: 'can also ascent' gives a meaning that TEP float by themselves but these are mainly transported to surface microlayer by rising bubbles through scavenging 3. Lines 109-110: "in situ studies of TEP distributions in the ocean are scarce, particularly in the open ocean (Table 2)". But Table 2 specifies TEP in surface layers. Kumar et al. (1998) and Ramaiah et al. (2000) provided the first TEP open ocean data from the Indian Ocean (see below for references). 4. Line 115: 'entire POC' will also include non-living non-TEP organic carbon fraction. This was not addressed in the manuscript. 5. Lines 147-148: Given the 18.7% difference in concentrations between TEP duplicates specify the errors in TEP-C estimation to compare with other org C-reservoirs. 6. Lines 175 to 202 and Lines 283-287: How accurate is the cell abundances counting of the respective biological groups? Please specify uncertainties involved. This is particularly important because each of subgroups will carry uncertainties in carbon per cell and that will be additive. Total uncertainties involved assume significance since a comparison is being made with TEP-C, where TEP estimation itself is semi-quantitative! For example, line 232-233 show phytoplankton biomass estimation carries nearly 50% of uncertainties in cell counts and cell C estimations! Authors discussion (Lines 343-353) on uncertainties in TEP-C contribution to POC arising from cell-C conversion and analytical artifacts is well appreciated. But the authors should help the readers by providing a comparative evaluation including errors in estimated carbon pools in a Table. 7. Line 310: 'we present the first inventory of surface TEP concentration' – can the seawater samples collected from 4 m depth be treated as representative of surface layer to make an inventory? Here seems to be an incompatibility that needs to be clarified. 8. Lines 360-364: Given the large uncertainties involved statements such as 'Only in one

station of the SWAS phyto–C dominated the TEP–C (line 360-1)' and 'with the maximum concentrations in the edge of the Canary Coastal Upwelling (CU, n = 1) (lines 45-46)' may be avoided as these oversimplify a complex reality of spatial variability in horizontal and vertical (see line 310 comment above) dimensions. 9. Lines 367-370: A good hypothesis. 10. Line 448: Please show the negative relation in a diagram. 11. Lines 462-463: Figure 3 suggests that in spite of higher (nearly double) contribution of phytos to %POC in SWAS than in OAO, TEP and HP contributions to %POC are nearly the same. It appears that HP is more important in regulating TEP concentrations in the Atalantic, in general. This is slightly different from what has been said in lines 472-473 (The drivers of TEP distribution were primarily phytoplankton and, to a lesser extent, heterotrophic prokaryotes)

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