

## ***Interactive comment on “The role of diatom resting spores for pelagic-benthic coupling in the Southern Ocean” by Mathieu Rembauville et al.***

**Anonymous Referee #1**

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The paper reports on lipid composition in five sediment traps placed in different sites of the Southern Ocean, characterized by different productivity: two of them (M6 and P2) were in HNLC waters, while three other sites (A3, M5 and P3) were located in naturally iron-fertilized areas characterized by higher productivity. Lipid composition markedly differed among these sites, with higher proportion of labile lipids in the naturally iron-fertilized waters. For one of the sediment traps (A3 located in the Kerguelen Plateau), quantitative data on the composition of settled material were available from a previous study. These data have been used to depict the seasonal trend in lipid composition as related to the biological components (diatom cells, resting spores and faecal pellets). Samples collected during the summer period were dominated by diatom resting spores, which transferred to depth a considerable amount of lipids, dominated by the labile

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MUFA and PUFA.

The study is interesting since provides the link between qualitative composition of sediment traps and the composition in lipids, which are also used as biomarkers to infer the origin of sinking material.

I have the following comment: The comparison between trap content and lipids was done for the sediment trap A3, which was deployed at relatively shallow depth as compared to the other traps. It is mentioned that the labile lipids can be degraded/remineralized with depth. Can the ‘fingerprint’ of lipids derived from diatom spores be preserved in the deeper layers? The other sediment traps placed in iron-enriched areas (P3 and M5) were much deeper; is it possible to state that the composition of lipids in these deep stations still reflects the contribution of diatom spores? Or of diatoms in general? The role of diatom spores in mediating a considerable carbon flux for the benthic organism has been demonstrated for the shallower areas: can it be extended to the deep stations in the productive areas as well? I would suggest the points listed above be addressed in the discussion.

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