

Interactive comment on “Carbon export and transfer to depth across the Southern Ocean Great Calcite Belt” by S. Z. Rosengard et al.

Anonymous Referee #2

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The authors present a 'carbon export and transfer efficiency' synthesis based 2 cruises for a total of 27 stations across the Southern Ocean Great Calcite Belt. Particle composition and fluxes (POC, PIC, BSi, and ^{234}Th activity) were estimated based on size fractionated particles ($>$ and $<51\mu\text{m}$) collected with in-situ pump. Particles vertical transfer were defined as being both 'flux attenuation' using the exponent (b) of the classical power-law fit of Martin's et al and 'Transfer efficiency' using the T100 of Bueseler and Boyd which is the remaining flux 100m bellow the flux at the depth of base of the euphotic zone. The authors showed that POC export correlated to BSi (and particule size) but not to PIC exports while PIC export correlated to POC transfer efficiency. They concluded (similarly to previous studies) that diatom-dominated communities produce large and labile POC aggregates, which generate high export fluxes but also drive more remineralization and they observed the opposite for smaller calcifying

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phytoplankton communities.

General comments:

I only have one minor comment related to the impact of the plankton community composition of POC export and remineralization. The authors present a large and well synthesized dataset of particle export but this paper is very 'particle centric'. Indeed, I would have liked to see external data to confirm their conclusions on the impact of the plankton community composition on POC export that is only based on BSi and PIC fluxes in this study. Is there any external data available (HPLC pigments, phytoplankton compositions from slides/cytometry, remote sensing estimations of phytoplankton composition such as PHYSAT and others ...)?

This paper is well written and clearly presented. Overall I recommend publication of this work after minor revisions. If the authors could back up their conclusions with a more complete dataset and analysis of the plankton community composition associated to POC export and remineralization in the Southern Ocean Great Calcite Belt, it would strengthen the impact of this work.

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