

Journal: BG

Title: The contribution of zooplankton faecal pellets to deep carbon transport in the Scotia Sea (Southern Ocean)

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General Comments

This paper deals with the impact of zooplankton faecal pellets to deep carbon transport in the Scotia Sea (Southern Ocean). The data set is constituted by time-series of organic carbon (OC) and faecal pellet (FP) fluxes acquired from February 2008 to April 2011 by automatic sediment traps moored at depths of 1500-2000 m in two sites close to South Georgia characterized by contrasting productivity regimes. Seasonal, inter-annual and regional changes of OC export were investigated with a particular focus on the role of faecal pellets in regulating the magnitude of these fluxes. In details, faecal pellets were counted and classified based on their morphology (round, ovoid, tabular, cylindrical, ellipsoidal) from which the zooplankton producers were inferred. Furthermore, the FP carbon content of each FP category was estimated, as well as the fraction of OC by FP (%FPC).

Overall, data are very interesting and of high quality. The manuscript is well organized, written and illustrated. The topic fits the scope of the journal. It is of broad international interest and most likely will represent a reference for similar future studies. The results of this study demonstrate that the feeding behavior and vertical distribution of the zooplankton community plays a critical role in controlling the quantity and quality of carbon exported to the ocean interior. The inclusion of these factors in global C export models can greatly improve them.

Specific Comments

- Authors wrote that the study is based on a 4-year long series of POC and faecal-pellet fluxes, but from February 2008 to April 2011 there are only 3 years and 2 months;
- I think it could be useful to provide also the mean values of the %FPC for each station, not only the maximum values.
- No mention is given on the kind of removed swimmers. Are they compatible with the zooplankton producers inferred by faecal pellets found in the traps? You should find some relationships at least at the P2 site, where deep-dwelling zooplankton prevails.
- Lateral advection of material to the sediment trap has not been taken into account in the manuscript. Please, add a comment on this topic. Explain why can be neglected in this area, that looks hard in absence of current meter data.

Technical Corrections

- In Methods, it is not clear the difference between the *surface* area (0.5 m²) and the *collecting* area (0.6 m²) of the sediment trap. In the trap manual from manufacturer site, the *aperture* area is specified to be 0.5 m² (diameter, 80 cm). I am not sure that it is only a typing error. If the area of 0.6 m² was used to calculate fluxes, then they were underestimated by 20%;
- In Sections 3.2 and 4.1, **silicoflagellates** to be replaced by **silicoflagellates**;
- row 23 of page 16115, **reflect** to be replaced by **reflects**;
- Last line of Section 4.4: **with** to be replaced by **within**;
- In Table 1, **Ovoid/Ellips.** can be understood as a ratio, which is wrong. Maybe **Ovoid+Ellips.** would be better.
- Figure 7, Legend shows some typo errors (cil. vs cyl.; ellis. vs ellip.; etc.)

- Figure 8, It is not clear at which year data are referred.