Our replies are shown in red.

Referee #2: P. Williams

I spotted a small inconsistency in the equations – it may be intended and accepted by specialists. In the equations #1, #2, #3, #4 and #8 Cq is used, whereas in the text it seems to me that the same property is referred to as Ceq. A similar apparent inconsistency is seen in the case of the delta values in Eq #8.

This should be c_{eq} throughout and it does appear as c_{eq} on our printout and screen directly taken from the online discussions webpage. If there is a discrepancy, it is not intentional.

In the section Comparison with Previous Marine Production Estimates in the Discussion, the authors make comparisons with in vitro measurements of photosynthetic production – based on 14C observations. With the 14C technique, there are errors due to containment. The in vitro measurements of N (their terminology) only should incur an in vitro error, and it would have been interesting to see how the in vitro and in situ N measurements compared.

To our knowledge the only published in vitro net community production measurements in the Bellingshausen Sea are those of Boyd et al. (1995). The authors derived depth-integrated *N* from dissolved oxygen changes in bottle incubations during November/December in 1993 at stations along 85° W and between 70° S and 67.5° S. Sampling season (late spring to beginning of summer compared to our sampling during end of summer to beginning of autumn) and geographical location (nearly 100 km north to our northernmost stations) differ from our study. Boyd et al. observed a retreat of the ice margin whereas during our cruise the sea ice was advancing. We therefore limit the comparison with our results to the region that remained ice-free during our sampling period (i.e. West of Adelaide Island, between 67° and 66° S and 70° to 74° W).
Boyd et al. reported a high chlorophyll feature at 67°30'S that was associated with a hydrographic front and not the retreating ice edge. This area with high rates of plankton metabolism was characterized by deep mixed layer depths (up to 70 m) and a shallow euphotic layer (30 m) in station K, while similar mixed layer depth and euphotic zone was observed in station J (>50 m). From the data in their Table 3, we derived with mixed-layer *N* values of (181±36) mmol m^{-2} d^{-1} and (46±22) mmol m^{-2} d^{-1} (station K). Our *N* values of (4±20) mmol m^{-2} d^{-1} in the WAI area are considerably lower than the values from Boyd et al., and this is possibly due to the latter were obtained towards the peak of the growing season opposite to our case. Despite the difference on our values, the biological oxygen flux at the WAI region of (-20±12) mmol m^{-2} d^{-1} on its own would not have shown autotrophy without the correction we made due to entrainment.

The full data set should be made available as it will be a valuable resource to other workers who may want to make their own particular analysis. The fieldwork was carried out in 2007, so sufficient time has elapsed to justify the data being in the public domain. There is in fact a requirement set by the NERC.

Many thanks for reminding us of this NERC policy. The oxygen isotope-related data are already available in the manuscript as electronic supplementary material. The hydrographic data for the CTD sections and underway measurements are held at the Polar Data Centre of the British Antarctic Survey, and can be accessed by contacting co-author Deborah Shoosmith. These data will be also made publicly available via the British Oceanographic Data Centre. We will make a note about this in the revised manuscript.