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Biogeosciences Discussions



# *Interactive comment on* "Macrofauna community inside and outside of the Darwin Mounds SAC, NE Atlantic" *by* N. Serpetti et al.

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We thank Dr Andrew Davies for the positive comments and for the effort on revising the manuscript. We followed all the changes suggested and integrated the discussion with the aspects underlined. Please see below for the detail of our responses.

1. Historic disturbance regime– Given that the onus of this manuscript is on investigating the effect of area closure, and therefore the effect of bottom-contact fishing disturbance, it would be beneficial if there was a greater literature review and consideration of fishing effort in the area. In some analysis we did in 2007 (Davies et al, 2007, Biological Conservation), we had limited VMS information that showed the distribution of vessels travelling at a speed that tallied with bottom trawling. Whether or not this, or newer information could provide insight into the past history of the site with respects to

disturbance I don't know, but it could be considered to provide a better quantified idea of disturbance levels.

Response: Since the initial discovery and surveys in 1998-2000, the RRS James Cook cruise 060 in May–June 2011 was the first scientific survey carried out in the Darwin Mounds area. The first high resolution sidescan sonar and video data collected illustrated that the area was heavily impacted by bottom trawling activities (Wheeler et al., 2005). This aspect was reinforced by Davies et al. (2007) showing an increase in vessel activity in the area just before the closure was put in place. A significant reduction in trawling intensity has been recorded in the area over the last 11 years. The reduction is especially marked in the Eastern Darwin Mounds (Huvenne, 2011), the area that was most heavily affected in 2003 (Davies et al., 2007), however some data indicates that some violation of the fisheries closure still occurs in the Western Darwin Mounds region (Huvenne, 2011). These aspects have been added in the discussion at pp. 16915 after line 17.

2. Inside, versus outside of SAC– This is the major factor in the work and the two areas differ by a depth range of 42-54m, could this be a strong factor in explaining the variation rather than the difference in disturbance regime? I don't feel that the data is testing a hypothesis as to whether the closure had an effect because there is no direct measurement of the effect (in this case disturbance) before it, only after it. Looking at the map of Figure 1, the proximity of the inside SAC samples to the edge of the closure may mean that there is some fishing still occurring in the area, see above comment. It would have been interesting to accurately determine the level of benthic disturbance from perhaps acoustic mapping data, but this is outside of the scope of the paper. Figure 1 inset, should show the 800m contour if possible.

Response: In a previous study (Bett 2001) researchers showed that throughout the Rockall Trough the benthic macrofauna communities gradually changed with depth. We agree that the depth range of ~50m could have an influence on the small differences in community when comparing stations outside and within the SAC. However, what



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we are trying to underline is the high similarity of the communities collected inside and outside the SAC (from 57% to 71%) and not the differences. The dissimilarity between our samples was mostly driven by high macrofaunal abundance outside the SAC resulting from the use of a fine mesh sieve (i.e. 250 $\mu$m): when the same size of mesh was used as in the other study (i.e. 500 $\mu$m), our total abundance was in the same order of magnitude as that found in the other areas of the Rockall Trough. The establishment of the Darwin Mounds SAC does not appear to have a significant effect on the macrofauna community in terms of biodiversity. As the referee highlights, one reason why the biodiversity of all the stations is similar is because of the proximity of the stations within the SAC to the SAC boundary; Huvenne (2011) has indicated that there is still some violation of the fisheries closure on the Western side of the Darwin Mounds. This part has now been integrated to the manuscript at page 16919, between lines 11-13).

The 800m contour in the Fig. 1 inset has been included

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