Biogeosciences Discuss., 9, C3742–C3745, 2012
www.biogeosciences-discuss.net/9/C3742/2012/

Biogeosciences Discussions

Interactive comment on "Putative fishery-induced changes in biomass and population size structures of demersal deep-sea fishes in ICES Sub-area VII, North East Atlantic Ocean" *by* J. A. Godbold et al.

Anonymous Referee #1

Received and published: 4 September 2012

Review Journal: Biogeosciences (BG) Title: Putative fishery-induced changes in biomass and population size structures of demersal deep-sea fishes in ICES Sub-area VII, North East Atlantic Ocean Author(s): J. A. Godbold, D. M. Bailey, M. A. Collins, J. D. M. Gordon, W. A. Spallek, and I. G. Priede MS No.: bg-2012-329 MS Type: Research Article Special Issue: Deep-sea ecosystems in European seas General comments: The manuscript analyzes scientific trawl surveys in the Porcupine Seabight and adjacent Abyssal Plain of the NE Atlantic collected in the periods 1977–1989 and 2000–2002, and intends to assess changes in demersal fish biomass and length fre-

quencies of the 8 most dominant fish species. The paper works a subset of the full data described, and previously partially analyzed by Bailey et al. (2009) and Priede et al. (2010, 2011) but in terms of abundance and diversity, being therefore an interesting complement to the previous papers. This exceptional data set allows the authors to add and explore important ecological consequences to the impacts of fisheries on several deep-water species. Deep-water species still poorly understood and the present contribution is a valuable effort to enhance their knowledge and of highly importance to better manage these species and the deep-water fisheries on the study area. Authors suggested sounding species-specific fishery impacts on both the biomass distribution and population structure of several deep demersal fish populations, which can extend beyond the depth at which fishing takes place. This is an important observation when considering the fishing impacts at the ecosystem level, and when the ecosystem approach to fisheries is gaining momentum. The manuscript is well written and uses adequate and advanced analytical methods/models. In my opinion however some explanations for the trends and patterns observed should be better grounded or explained. Specific notes: Methods: Lines 22-24 "The Kolmogorov-Smirnoff (K-S) test was used to determine if the length-frequency distribution of the 8 dominant demersal fish species differed significantly between the early and the late period." Because the length frequencies of only 3 of the 8 species were analyzed in detailed this sentence must be changed from 8 to 3. A justification of why the length frequencies of the other species were not analyzed should also be added.

Results:

- A table with the official catches (and if possible discards) of this species in the study area in the two periods will help interpretations, since the level of the catches of each species is important to compare with the increases or decreases of the species abundances (this table could go as a supplementary material).

Discussion In all discussion information on the commercial fishery in the area is scarce. We don't know if fishing gears configurations change much, including the selectivity, the

BGD

9, C3742–C3745, 2012

discard rates of some species, the fishing depths, etc. (commercial fishing operations tends to go deeper when shallower resources are being depleted for example).This will be helpful to understand the patterns and trends found, especially for those less important species. On the other hand the removal of predators and the decrease in the inter and intraspecific competition increasing the availability of food in my opinion appear to play a more important role in the patterns observed than what is written, for the species Nezumia aequalis, and Halosauropsis macrochir, S. kaupii, L. eques, and A. rostrata. Even in the case of the C. rupestris (first panel 800-1300m) the density compensation growth phenomena is apparent. - Page 10769, Lines 7-8 – "although at the shallower end of its depth range the results suggest higher frequencies of smaller individuals (<10 cm head length) in the early 2000s." In think this is the contrary of what we see in the Figure 6a, and contradicts the following sentence made in the Results Page 10767, Line 16-19: "The results suggest that in the 800–1300m depth interval there was a decline in the number of small individuals shifting the modal head length from 6.9 cm in the early to 8.9 cm in the late." - Page 10769, Line 20 – 25. Because the length frequencies of C. guentheri were not analyzed in detail, and because in line 24 the authors refers that this species have a significant increase in body size with depth (Collins et al. 2005)we cannot conclude that fishery affects this species further up the slope. The observed decrease in biomass between the two periods can be a recruitment problem for example(if juveniles recruit in shallower waters). Further the observed biomass reduction goes much further down than the depths affected by the fishery (1500 m). This should be clarified. - Page 10769. Line29. Fig. 5 should be Fig. 4 (C. armatus) - The abundance and biomass time/spatial trends of Antimora rostrata. In Pried et al 2011 a possible explanation for the increase in the abundance was the possibility of recruitment events or an ecosystem effect (?). This species is apparently highly vulnerable to the trawl gears used and apparently is highly mobile. Because length frequencies were not analyzed (to test recruitment) I would also suggest possible movements of the species to shallower waters as a result of the decrease of abundance of possible competing species or predators. Other possibility can be re-

BGD

9, C3742–C3745, 2012

lated with a decrease in the commercial catches of this species in the last period, and the Table of the official catches (see above) will help here to see if there was any observable change of species selectivity on the commercial fishery? - Sentence of Line 25 of page 10770 should be better explained or references are missing. - page 10771, Lines 5 – 13. In the case of the S. kaupii the apparent stability of the biomass and the decrease of the abundance can also be explain by a density dependent compensatory growth as the authors mention for the case of the Nezumia aequalis, and Halosauropsis macrochir. If we look to Figs. 6b (S. kaupii) larger individuals are observed both in shallower strata as well as in deep strata. This species is apparently highly mobile, and the decrease in the abundance was high. If the intraspecific competition decrease this may result in more food available, and then the growth rates are expected to be higher. A small number of predators may also justify the observed pattern - For L. eques the same justification like that for the S. kaupii and others could apply. In Pried et al 2011 the authors detect an increase in abundance in the late period (this is not commented here? Why?), which could be attributable to the removal of predators, as observed by Lorance (1998) for the area.

Interactive comment on Biogeosciences Discuss., 9, 10757, 2012.