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Biogeosciences
Discussions

Interactive comment on "Changes in polychaete standing stock and diversity on the northern side of Senghor Seamount (NE Atlantic)" *by* A. J. Chivers et al.

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The authors would like to thank the reviewer for their positive comments. Suggested changes and comments have been taken into account and relevant changes and improvements made to the manuscript.

COMMENTS: Comment 1: Introduction: 18448, L20-24: What do you mean with significant?

Response: This sentence has been removed.

Comment 2: Methods: The reviewer identified some omissions within the methods

section: 1. The sample size is not clearly stated. 2. The limited sampling protocol is not discussed 'up front'. 3. A reason for using each diversity index is not stated. In addition the hypotheses to be tested with each index has been omitted, it has not been explained why so many indices are used. 4. Hypotheses tested with the cluster and MDS ordination are not stated.

Response: We have taken on board the comments made by the referee. 1. We have now added sample size to Table 1 and this is also mentioned within the text, Section 2.1: Sampling methods 2. The limited sampling regime has been discussed up front, "Limiting the analysis to one transect may however restrict our ability to fully describe infaunal diversity and to detect expected differences with depth." (Section: 2.1 Sampling methods).

3. Explanation of the diversity indices used and why has been included within section 2.2: Data analysis. "The use of these diversity indices enables analysis of between station alpha diversity values. Each index varies in its sensitivity to the species richness and evenness components of a species data set. They also vary in the degree to which they are influenced by sample size (species richness more so than evenness and dominance indices). It was therefore deemed prudent to include four diversity indices within the diversity analysis. This enables species richness, evenness, dominance and species diversity between stations to be measured."

4. The cluster and MDS ordination were undertaken to test the hypothesis that stations differ in terms of species community composition. The Hypothesis being tested with the cluster analysis and MDS ordination has been added to Section: 2.2 Data analysis.

Comment 3: Results: The reviewer also highlighted a few additional changes that they wished to have included within the manuscript (listed below):

1. SE within the text 2. Results of significance testing for abundance values 3. Replacement of 18452, L14: "total individuals" with "numbers of individuals" 4. A description of the diversity indices, their differences and meaning 5. Clarification regarding the

species richness values for the summit station 6. A more detailed figure caption for figure 3

Response: 1. We have provided approximate abundance values not exact values within the text, and hence have not included the standard error values in the text as we do not feel it is appropriate. All values, including standard error, are given in Table 2.

2. An ANOVA test has now been included within the results section: 3.2 Standing stock, also section 3.4 Polychaete species diversity and are fully discussed within Section 4 Discussion, 4.1Changes in polychaete standing stock with depth; 4.3 Changes in polychaete species diversity and composition. The observed abundance values do indeed decline noticeably at the upper slope station and then increase slightly at the mid-slope station, before declining at the base station, this difference in abundance is not significant. The authors have made this clearer within the text (Results section: 3.2 Standing stock).

3. "Total individuals" has been replaced with "numbers of individuals".

4. The diversity indices have now been better described, along with the reason for using each index and the specific hypotheses to be tested. See Section : 2.2 Data analysis

5. The richness (n sp./station) is highest at the summit station. The authors were referring to the richness index (Margalef's d': d = (S-1) / ln N) which provides a standardised number of species encountered against the total number of individuals encountered. The d' value is lowest at the summit station. This has been made clearer within the text, see Section: 3.4 Polychaete species diversity.

6. Additional information has now been included within the caption for figure 3 i.e. Diversity of the macrobenthic polychaetes along the North transect: (a) Number of species/station, (b) Margalef's Richness (d'), (c) Shannon's Diversity (HËĹloge), (d) Pielou's Evenness (JËĹ), (e) Simpson's Dominance (1-λ).

Comment 4: Regarding the discussion the reviewer made some useful and constructive comments which have been listed below: 1. The discussion could be shortened and be presented in a more concise and organised way with less speculative statements. 2. Confusion regarding the comparison between Senghor Seamount and other studies in the NE Atlantic (18454, L6-14 and 18458, L4-16) 3. 18454, L16-14: How this value compares with the other habitats with similar depth range (e.g. continental slope) 4. The statement that the study may have limited interest because what occurs biologically on one side of the seamount may not hold true on other aspects of the seamount. 5. The ratio in numbers of individuals per family (e.g.954/34) would give a better value to compare between seamounts. 6. Lack of opposing studies. 7. A speculative last sentence.

Response: 1. The discussion section has been revised but still presented with the same sub-section structure as the authors feel this is the most suitable arrangement for the discussion of results. The authors have made every effort to include the environmental data which has now become available and to include this information within the discussion sections. Previous speculative statements and conclusions have now been altered and conclusions based upon observed fact (See section 4 Discussion, 4.1 Changes in polychete standing stock with depth; 4.2 Changes in polychete family diversity and composition; 4.3 Changes in polychaete species diversity and composition)

2. It is difficult to make direct comparisons with Gillet and Dauvin (2000; 2003) and Surugiu et al.'s (2008) studies due to the mentioned sampling differences between the studies e.g. use of qualitative sampling techniques, and a markedly different sampling technique and a more restricted depth range (See section: 4.2 Changes in polychaete family diversity and composition).The lack of quantitative macrofaunal seamount studies from the NE Atlantic does however make comparison to qualitative studies in the region necessary.

3. An effort has been made to include further studies from comparable depth ranges

e.g. slope habitats at comparable depth regions in the West African region. Results from these studies have been included within Section 5. Discussion, Sub-section 5.1 Changes in polychaete standing stock with depth.

Additional references have now been included:

a. Galeron, J., Menot, L., Renaud, N., Crassous, P., Khripounoff, A., Treignier, C., and Sibuet, M.: Spatial and temporal patterns of benthic macrofaunal communities on the deep continental margin in the Gulf of Guinea, Deep-Sea Res Pt. II, 56, 2299-2312, 2009.

b. Galeron, J., Sibuet, M., Mahaut, M,L., and Dinet, A.: Variation in structure and biomass of the benthic communities at three contrasting sites in the tropical Northeast Atlantic, Mar. Ecol., 197, 121-137, 2000.

4. As the referee themselves state "this infauna data set (is) quite unique". The authors therefore believe this study will certainly be of interest. We do accept the referees comments and have removed this paragraph based upon the fact that these comments are speculative.

5. We like the suggestion made by the referee regarding ratios, however, as the referee themselves have highlighted, there is an issue with sample size when comparing our results from the megacorer with those from a sledge. We are uncomfortable in undertaking these ratio comparisons and do not feel that the results would be truly comparable between stations and hence have not undertaken this analysis.

6. We are fully aware of the various theories surrounding biodiversity of seamounts and potential hotspots and have re-phrased this section to take this into account. (See section 5.3: Changes in polychaete species diversity and composition).

Additional references have also been added to this section in order to support our arguments:

a. O'Hara, T.: Seamounts: centres of endemism or species richness for ophiuroids?,

Global Ecol. Biogeogr., 16, 720-732, 2007.

b. Howell, K.L., Mowles, S.L., and Foggo, A.: Mounting evidence: near-slope seamounts are faunally indistinct from an adjacent bank, Mar. Ecol., 31, 1-11, 2010.

c. Narayanaswamy, B.E., Hughes, D.J., Howell, K.L., Davies, J., and Jacobs, C.: First observations of megafaunal communities inhabiting George Bligh Bank, Northeast Atlantic, Deep-sea Res Pt. II, , 2013. Doi:10.1016/j.dsr2.2013.03.004

7. The final sentence has been altered to make it less speculative.

Interactive comment on Biogeosciences Discuss., 9, 18447, 2012.