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Biogeosciences Discussions

Interactive comment on "Diversity, distribution and spatial structure of the cold-water coral fauna of the Azores (NE Atlantic)" *by* A. Braga-Henriques et al.

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We thank the reviewer for the positive appreciation and valuable comments to our work.

We acknowledge the reviewer's observations regarding pre-treatment of data, and this was also one of our main concerns considering the multiple data sources combined in this study. This is a common issue with deep-sea studies, especially when dealing with historical data, as we were able to realize from the literature (e.g. O'Hara 2007; Stocks and Hart, 2007; Rowden et al., 2010; all cited in the paper).

We performed data quality checking in several ways:

1. We verified the sampling information of each geo-referenced record in a GIS environment to exclude records without a positive match of all information (depth, locality name, geographical coordinates).

2. We checked for the most accurate sampling information available for each record and inaccuracies detected among station numbers of the same campaign were corrected (e.g. typing errors). We were unable to find information regarding both start and end position of trawled or other type of gears for historical expeditions, with the exception of nine stations from the Prince Albert 1st of Monaco campaigns (PAM). We checked if in these cases the trawl track (assuming a straight line between start and end positions) crossed different grid cells used for calculation of species richness, which was not the case. Nonetheless, given that these were scientific surveys it is unlikely that trawl length was long enough to introduce significant spatial error at the scale of our analysis (20 x 20 km or specific geomorphic feature).

Recent data from bottom longline scientific surveys were set up by depth strata of 50 metres. Therefore the spatial error associated with these records was negligible. Furthermore, in most cases we have the exact location of each coral collection and no mid-point coordinate was assigned. Records lacking the information regarding depth strata were eliminated from the study. As for records obtained by observers on the bottom longline commercial fleet, they also have accurate sampling information.

3. Depth data were based on the actual information stated in the original sources, and none were inferred from their location using GIS bathymetric layers. The majority of records assembled from the multiple sources presented a single value for depth (e.g. PAM, Challenger). When this was not the case, mid-point depths were calculated for records with depth intervals $\leq$ to 350 m. Records falling outside this range were excluded from the dataset as well as those lacking depth information. The only exception to this procedure consisted of deep stations from Cancap-V (stn. 5.004, 2400-3100m; stn. 5.005, 1650-2050m; stn. 5.023, 1350-2000m; stn. 5.052, 2500-3000m), Bartlett (stn. 14, 1400-2200m) and Centob-cruise Marvel (dive PL1199, 2200-2600m), which

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consist of unique deep records that needed to be considered otherwise some species bathymetric ranges and species diversity account would be inaccurate. Nevertheless, those records were not included in the species list used in the multivariate analysis to detect spatial trends in assemblage composition.

4. We used Spearman's correlation coefficient and the RELATE routine implemented in PRIMER-E to assess whether discrepancies in sampling effort among features had a significant influence on the observed distributional patterns (pg. 536, ln. 9).

We agree with the reviewer in the sense that it would be useful to represent coral diversity using some measure of sampling effort. Thus, we will present a map with number of specimens per 20 x 20 Km grid cell alongside Figure 4 (depicting total number of species per 20 x 20 Km grid cell) as suggested. Notwithstanding, this representation should be interpreted with some caution due to the fact that abundance data for solitary scleractinians were underestimated in some historical hauls.

All specific comments will be addressed in the next version of the ms as follow:

line 14: "nine of which", not clear on the meaning, is this nine new species observations for the area? REPLY: Yes. We will rephrase the text accordingly.

pg 533, line 26: "individuals" -> "separate colonies". REPLY: We used the word 'individuals' to designate individual organisms, weather they are colonial or solitary. Therefore, we also do not think that the term 'separate colonies' would be correct.

pg 534, line 20-21: Were midpoint depths applied too? REPLY: Addressed above.

pg 535, line 25: You give a reference for the seamount locations, but what about the other features? REPLY: Locations of data points on island slopes were confirmed using the bathymetric layer from Lourenço et al. (1998). We will add this reference to the ms: Lourenço et al. (1998). Morpho-tectonic analysis of the Azores volcanic plateau from a new bathymetric compilation of the area. Mar. Geophys. Res. 20: 141-156.

pg 537, line 11: "good discriminating species" - poor English. REPLY: We decided

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to use this term based on the fact that it corresponds to the technical designation given by Clark and Warwick (2001: pg. 7-3, ln. 5) for species exhibiting a ratio of average dissimilarity to standard deviation equal or greater than 1.3. Nonetheless we will replace the above expression with 'species with high discriminating power'. Clarke, KR and Warwick RM (2001). Change in marine communities: an approach to statistical analysis and interpretation, 2nd edition. PRIMER-E, Plymouth.

pg 537, line 15: perhaps you be adding author names to the first use of each species names to be taxonomically rigourous. REPLY: We had this doubt while writing the paper but given the frequency of numerous species names, with some of them followed by references, we decided to include the authority name of each species only in the table A1 so as to not compromise the readability of the paper.

pg 539, line 28: "D. aff. meteor" - it is not clear from the text to which genus this refers. REPLY: The first mention of Dentomuricea aff. meteor is given previously on page 535, line 1-2.

pg 540, line 17: I'm not sure I'd describe these distribution patterns as similar. There are lots of sites without Antipatharia samples. Perhaps similar centres of diversity is better. REPLY: We agree, therefore the text will be changed according to the reviewer's suggestion.

pg 541, line 1-2: Area of sampling is not the only difference between long line and trawl. The area of sampling does not account for the accumulation curve difference. Long-line bicatch is predominantly limited to larger specimens that easily 'snag'. Trawling will sweep up a wider variety of species. This is why the assymptotes of the two curves are at different levels. REPLY: We agree with the reviewer's interpretation and this was already reflected in the Discussion (pg. 544, ln. 1-7). For better clarification we will also mention this aspect in the Results.

pg 541, line 12-20: Have you considered reporting species per sample as a metric to correct for sampling effort? REPLY: We have initially considered that option but we

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decided to present the data as in Figure 6 given that different samplings gears were used and therefore sampling effort is not directly comparable among samples.

Yours faithfully, Andreia Braga-Henriques and co-authors

Interactive comment on Biogeosciences Discuss., 10, 529, 2013.

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Interactive Discussion

Discussion Paper