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Interactive comment on "Cold-water coral growth under extreme environmental conditions, the Cape Lookout area, NW Atlantic" *by* F. Mienis et al.

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Comments reviewer 1

We wish to thank the reviewer for the efforts and input provided. We carefully went through all the comments and suggestions. We have adjusted the manuscript according to the comments made. Below we provide a description of the adjustments made, addressing the reviewers remarks.

Broad comments:

1) Where is Figure 2? It does not seem to be attached. Figure 2 was included. We have uploaded it again. 2) The discussion is rather light on comments on associate fauna. Organisms such as 'anenomes' are logged and presented in figures, and seem

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to vary in abundance between substrates and perhaps transect. Could some of these distributions be related to published observations from other reefs, or some sort of statistical investigations carried out? I presume the dataset may not be extensive enough for this, or that coverage of some habitat types is much higher than others, making comparisons between types difficult..? We have clarified in the text that the faunistic data in the manuscript represent a gross analyses of the fauna on the tethered video recordings. The major aim of this analysis was to show that reefs not only differed in aspect and morphology but also in associated fauna. For this purpose it was sufficient to use large taxonomic categories instead of species as shown by the results of a statistical test. Detailed analyses of the species diversity and abundance of invertebrates and fish species recorded on the video will be presented in another manuscript as this needs much more space. However it will not alter the conclusions in the paper. We have extended the discussion accordingly.

Detailed comments:

1) Abstract, line 21... is 'features' the right word here? perhaps 'environmental parameters' or somesuch? We rephrased abstract, line 21. "features" is replaced by "events, characterised by large fluctuations in environmental conditions" 2) p 18928 , line 25 - '...the suitability of this region for maintaining living coral.' From the data it is clear that live coral is 'maintained' here, even if it isn't thriving... as it stands the sentence reads to me a bit like you are investigating the region to see where there may be areas for coral to colonise in the future... Rephrased sentence p18928, line 25. New sentence "The main aim of this study is to describe and discuss the mound distribution and morphology, sedimentary environment and near-bed environmental conditions in the coral area near Cape Lookout (North Carolina, USA) and to assess its suitability for cold-water corals and associated megafauna" 3) p 18935, lines 20 onward. Fish. These problematic mobile beasts are counted, but how? Are they counted on first occurrence in the video? Do they nicely stay put or follow along with the camera? Are they all species which are basically sitting on the bottom? I would put a comment on

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the protocol in here to ease comparisons with the other papers, and those from Coral-FISH I suppose will be published in the near future. The fishes we saw in and around the coral framework were either stationary or slow moving. As their swimming speed was lower than the speed with which the camera was towed double counts are unlikely. The fish were enumerated by counts on successive frames of the HD video recording. 4) p 18935, lines 21 and 25 onward. Is there a reason why these categories were chosen? Was there insufficient video to subdivide further? category 2 seems rather broad (for some coral locations). 50 m is also pretty large a section length. If there was a reason (or previous study using these lengths and categories) I think it should be noted. This is a first attempt to give a broad overview of the megafauna and fish community in this area. Detailed analyses of the diversity and abundance of invertebrates and fish species recorded on the video will be presented in another manuscript. 5) p 18939, line 3. 'There was a very different character to...' I think this sentence is a bit awkward to read. P18939, line 3. Rephrased the sentence. "Velocities recorded before mid-April 2010 and afterwards had a different character" 6) p 18939, line 7. The temperature max is now given, but how big was the jump? It would be nice to have it in the text, rather than having to go look for it in the figure? The T and salinity range within a day are given on page 18939, last sentence and first sentences of page 18940. 7) p 18939, line 17. An 'obvious' migration? Sounds very certain for the results..perhaps 'daily migration looks likely...' or somesuch. I am no expert on this sort of measurement so perhaps the migration is obvious... Rephrased this sentence 8) p 18939, line 24. Comment as 7) , but also for salinity. See point 6. 9) p 18940, line 7. 'Fluorescence records on..?' perhaps 'fluorescence measurements measured by...' would be better? Rephrased line 7, page 18940. New sentence "The fluorescence pattern records were similar on both landers locations" 10) p 18942, line 6. Do you mean just framework increase, or live framework? Framework is also in category 2 from your system. Perhaps here it would be nice to nail down exactly which framework increase you mean, by referring to the category number, or spelling it out clearly in text. We have rewritten this part of the discussion, explaining in more detail what the differences are and

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integrating environmental parameters and ecology data. 11) p 18945, line 2. 'Upper lethal..' sounds rather certain? The Brooke paper presents such a limit and is using corals from the region for the work - but how about other Lophelia pertusa corals from elsewhere, such as the Med? Is it possible these will continue to function in higher temperatures? I would add a sentence qualifying this. We show that Lophelia can exist in a high temperature region as measured by us in this paper. We did not measure the sublethal impact of the high temperature on for instance the condition of the coral or it's reproductive capacity. Large temperature jumps for one thing will certainly affect the respiration of the corals. Dodds et al. have shown that corals have very high Q10 values indicating great sensitivity to temperature change. This means that corals can only thrive in areas with such T jumps when abundant high quality food is available to satisfy respiratory demands. 12) p 18946, line 27. The abrasive nature of sand within strong currents and possible impact on corals is a very interesting point I think. Perhaps fishery closures of coral reefs, whilst protecting them from direct trawling, is still leaving them to daily (hourly?) plumes of fast moving sand? This is a valid point made by the reviewer but in our opinion impacts of fisheries are beyond the scope of this particular paper. 13) p 18946, line 29. I think high flow reduces prey capture efficiency, and quite severely... I don't think it can be said that the corals are unable to feed under XXX velocity flow at present... Perhaps '...likely not able to feed at an optimal or sufficient rate to preclude the use of internal reserves' or something like this. Rephrased sentence. New sentence "During these periods corals will likely not be able to feed at an optimal or sufficient rate" 14) Referencing format is not uniform... variations within the Dorschel et al. references for example... another swift check through required here. We have checked all references and created a revised reference list.

Interactive comment on Biogeosciences Discuss., 10, 18925, 2013.