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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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Mienis et al. report the output of a thorough investigation of one of the understudied cold-water coral areas of the western North Atlantic ocean. By conducting ecosounder, Lander and video surveys of the reef environment they have produced a temporal and spatial data set describing change and variability in many environmental parameters. These measured parameters, along with the locations of corals logged from videos, are related to the output from predictive coral distribution also included within the exhaustive paper.

In addition to greatly adding to the level of knowledge on environmental conditions found at cold-water coral reefs in general, the paper shows that cold-water corals can endure very sizable temperature jumps; in the location described these jumps seem

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to be roughly double those reported for eastern Atlantic corals, and combined with various morphological and faunal characteristics, they assume this perhaps indicates a reef region at the edge of viability.

The current submitted version of the paper is in my opinion in a good state, though I have a few probably less than essential suggestions and comments to make:

#### BROAD COMMENTS :

- 1) Where is Figure 2? It does not seem to be attached.
- 2) The discussion is rather light on comments on associate fauna. Organisms such as 'anemones' are logged and presented in figures, and seem 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..? If there could be something added here it would be nice.

#### DETAILED COMMENTS :

- 1) Abstract, line 21... is 'features' the right word here? perhaps 'environmental parameters' or somesuch?
- 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...
- 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 the protocol in here to ease comparisons with the other papers, and those from CoralFISH I suppose will be published in the near future.

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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.

5) p 18939, line 3. 'There was a very different character to..' I think this sentence is a bit awkward to read.

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?

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...

8) p 18939, line 24. Comment as 7) , but also for salinity.

9) p 18940, line 7. 'Fluorescence records on..?' perhaps 'fluorescence measurements measured by..' would be better?

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.

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.

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? Is this point worth commenting on here?

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.

14) Referencing format is not uniform... variations within the Dorschel et al. references for example... another swift check through required here.

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

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