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***Interactive comment on “Bathymetrical
distribution and size structure of cold-water coral
populations in the Cap de Creus and
Lacaze-Duthiers canyons (northwestern
Mediterranean)” by A. Gori et al.***

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General Comments:

The manuscript submitted by Gori et al. presents a nice and focussed study of two submarine canyons along the margin of the Gulf of Lions. This margin is characterised by a high density of submarine canyons, and by particular processes taking place in them (e.g. dense shelf water cascading), hence it is an important place for the study of the effect of environmental conditions on biological communities. Too little is known

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about such interactions, even for the most enigmatic communities such as cold-water corals. This is a major limitation in the current evolution towards the designation of Marine Protected Areas and conservation zones.

The paper by Gori et al. takes our understanding one step further, by providing an insight in the spatial distribution of the coral communities and their size structure – evaluating the important ecological question if the population still exhibits recent recruitment, and therefore is in a stable condition. The quality of the work presented is good, while the results are well-supported by the analyses and clearly relevant to current scientific and societal questions.

Overall, I would recommend this paper for publication after some technical revisions (see details below). I wish good luck with their final submission,

Best Regards,

Veerle

Specific Comments:

- I agree with Reviewer Andy Davies that a little more information about the multibeam data (at least an idea about the resolution, i.e. pixel size) would be helpful.

- As far as I understand, you have measured the angle of the colonies versus the vertical, upward direction (i.e. 0° = vertical, 90° = horizontal, 135° = partly hanging down and 180° = fully up-side down). This is not the angle versus the substratum: most of the time the vertical upward colonies will actually have an angle versus the (horizontal) substratum of 90° , while the angle between colonies and substratum also can never be more than 90° (i.e. perpendicular). I suggest you do not call this parameter 'orientation with respect to substrate', but rather 'vertical orientation' of the coral, and explain the 4 categories in the methods section. On a different, but related note, I was also not sure why you did not include a class of 45° , while an orientation of 135° did seem to have its own merit?

- The Lophelia cliff colonies observed in LDC are indeed similar to the coral cliff described for the Whittard Canyon, although the extent of the community is 2 orders of magnitude smaller: the Whittard coral wall is 120m high and 1600m long. Is there any indication that there may be more of these cliff communities in LDC, which could make up an entire reef as observed in Whittard? Or is the 20m wide colony framework a unique feature?

- Pg 19066: The cited paper by Purser et al. (2010) about food capture rates as related to flow velocity, specifically focuses on zooplankton. Depending on which food source the CWC in LDC and CCC prefer, a higher flow velocity may still be beneficial in providing more phytoplankton.

Technical Corrections:

- Pg 19056, L12: you could add Harris & Whiteway (2011, Marine Geology) in here as a reference

- Pg 19056, L12: 'the World's Oceans'

- Pg 19056, L16: "The high structural heterogeneity originating from the growth of CWC provides a complex mosaic of habitats, and promotes the presence of a highly diverse..."

- Pg 19057, L1: "presents unique characteristics..."

- Pg 19057, L26: "..., with a continental shelf width..."

- Pg 19058, L5: "High-resolution multibeam bathymetry from the heads of both submarine canyons was available and has been used in this study" (bathymetry doesn't really have a plural – see also the Figure caption of Fig. 2)

- Pg 19058, L7: "The northern flank of the canyon displays a smooth morphology, with rounded gullies and scars: a depositional regime prevails in this sector."

- Pg 19058, L10: "..., with a predominantly erosive regime."

- Pg 19058, L13: "..., with strong bottom currents and..."
- Pg 19058, L28: "The northern flank, in contrast, is steeper, and shows smooth..."
- Pg 19059, L23: "...in September 2007 with the manned submersible JAGO (400 operation depth, equipped with a 1080 horizontal lines colour video camera..."
- Pg 19060, L3: "The pair of parallel laser beams allowed demarcation of 1.5 m-wide observation transects along the path of each dive."
- Pg 19060, L5: "All colonies of the studied coral species appearing within the 1.5 m-wide observational transects were counted ..."
- Pg 19060, L7: "... with respect to the substrate were recorded..."
- Pg 19063, L25: "Wienberg et al."

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