

Reply to reviewer

Dear authors,

Please find below my comments for your revised manuscript entitled " Resemblance of the global depth-distribution of internal-tide generation and cold-water Coral occurrences" submitted to EGU'sphere.

Thank you for addressing the comments raised in the first review of the paper. The paper now reads more coherently and the results and discussion are improved with wider literature review and the recognition of data limitations and distinguishing global from regional interpretations of findings.

Dear reviewer, thank you for your comments on our revised manuscript. Below is our detailed reply to your comments. Kind regards, Anna van der Kaaden

Line – 25 – ‘In 66.9% of all cases, cold-water corals occurred on a topography that is supercritical to the M2 tide, whereas globally only 9.4% of all topography is supercritical.’

Could this be changed to ‘in our study...66.9% of all cases, cold-water corals occurred on a topography that is supercritical to the M2 tide, whereas globally only 9.4% of all topography is supercritical.’ Or clearly express that this value is expected based on the percentage of all transects.

Indeed, it would be better to write “in our study,...”. So, we changed it, thank you.

Line 50 – I would suggest changing ‘deeper layers’ to ‘greater water depths’.

Indeed, we like your phrasing better, so we changed the sentence to “..., organic matter is degraded by organisms in the water column, decreasing the food quantity and quality for benthic life at greater water depths.”

Line 51 – I would suggest changing ‘stimulate’ to ‘facilitate’.

We changed it.

Line 53 – I would suggest changing CWC back to Cold-water coral when it is at the start of a sentence. Same throughout manuscript.

That would be better indeed. We changed CWC to Cold-water coral everywhere where it was at the start of a sentence.

Figures (ALL). Can resolution be improved? Currently, it is not possible to review these figures and their updates.

I will upload the figures in separate files. I noticed that the figures had a very low resolution in the track-changes manuscript, but the right resolution in the revised manuscript (without track-changes).

Line 151 – The authors describe that *Bathelia candida* was omitted due to few and not in corresponding bathymetry. Since the authors refer to selecting all main reef forming CWCs, and yet make no mention of this prominent reef former of the SW Atlantic they should make a mention of it here to demonstrate that they have considered it and explain why it was omitted or that it may have been included under ICES VME category as they have done in their response.

We added to the methods (line 152): “Roberts and Cairns (2014) also mention the species *Bathelia candida* as a main CWC reef-building species. We did not include this species in our analysis, resulting in the omission of 4 eligible datapoints from the NOAA and/or OBIS databases near transect 7 (SH). The species might be included in the data from ICES, as we selected all “Stony corals” in “Cold-water coral reef” habitat.”

Line 753 – Should ‘cold-water occurrences’ by ‘CWC occurrences’?

Yes, thank you.

Line 176 – Would it read better as ‘Consequently in our analysis’?

We added ‘hence’ to the sentence: “...will therefore be limited. Hence, in our analyses, we only included...”

Line – 361 – The first section of the results under ‘Critical reflection and trapped internal tide’ includes introductory sentences on internal tide behaviour – this information could be better placed in the introduction than the results section.

Yes, this is right and we do explain this in the introduction. However, we noticed that figure 9 (the barplot) was difficult to interpret for readers that were less familiar with the internal tide. We therefore chose to leave the introductory sentences at the beginning of section 3.4 (line 328).

Line 432 – ‘might cause some deviations our calculations of the proportions of slope

criticality with high-resolution bathymetry’. Suggest ‘might cause some deviations from our calculations of the proportions of slope criticality with high-resolution bathymetry’.

Yes, thank you.

Line 482- The authors state ‘CWCs further often occur in deep canyons (e.g., Pearman et al., 2020; Gori et al., 2013; Price et al., 2021) that can be a sink of particulate organic matter by focussing internal tides. (Allen and Durrieu de Madron, 2009; Wilson et al., 2015)’ The authors could further exemplify that these features will have been ‘smoothed out’ from the bathymetry so the reader understand the link.

Yes, thank you, we should elaborate the sentence indeed. It is not that we smoothed them out, but more that we focussed on continental slopes rather than the open ocean.

We changed the sentence to: “Cold-water corals further often occur in deep canyons that can be a sink of particule organic matter by focussing internal tides. However, such canyons were not included in our analysis of continental slopes.”

Line 505 – If linking to the sentence above this sentence could benefit from beginning as ‘
For example,’

Thank you, that is clearer indeed. We changed it.

Line 516 – This sentence is unclear.

We changed the sentence “Another alternative food supply mechanism for CWCs that can change the relationship between the depth of CWCs and internal-tide generation comes from the formation of CWC mounds.” to: “The formation of CWC mounds might also change the relationship between the depth of CWCs and internal-tide generation.”

520 – ‘meter’ to ‘meters’

Yes, thank you.

522- ‘might be several hundred meters higher than the depth at which they initially settled.’

Do you mean ‘might be several hundred meters higher than the depth at which the mound initially established’?

We clarified the sentence to: “So, the present depth at which some CWCs occur (on the mound) might be several hundred meters higher than the depth at which the corals initially settled (on the seafloor).”

Line 545 – rather than ‘relax’ it is likely that it makes the relationship more complex?

We meant that the corals are less dependent on internal-tide generation for their food supply when they have alternative food supply mechanisms. We clarified the sentence: “...as internal tides can be generated at multiple depths along a continental slope and alternative food supply mechanisms to CWCs exist that might make the corals less dependent on internal tidal waves.”

Line 547 – Add reefs as well as mounds?

We changed it to: “CWC (mound/reef) growth.”

Please check the consistency of the use of the term Northern Hemisphere and its acronym

NH throughout the text.

We checked whether we used Northern Hemisphere and Southern Hemisphere correctly, and we added NH before the seasons in the text to clarify that we classified the seasons according to the NH not SH.