

## ***Interactive comment on “Cold-water corals and hydrocarbon-rich seepage in the Pompeia Province (Gulf of Cádiz) – living on the edge” by Blanca Rincón-Tomás et al.***

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Authors response to Referee n° 1

We are thankful for the constructive and helpful comments that have helped us to improve our manuscript. We are aware that the manuscript holds a high amount of data which can be difficult to follow at some points and tried to keep it as concise as possible. We considered all comments carefully and modified and followed most of the suggestions.

Specific Comments from Referee n° 1

C1

2) The introduction reads well. One question is whether you have a testable hypothesis. Are you trying to ask whether the corals are fueled by fluids versus scavenging from currents. How are you going to distinguish between mechanisms?

Response: the aim of the study is to address the linkage between CWCs and present day formation of MDACs in the Pompeia Province. For this purpose, we combined analyses of ROV images, geophysical data and sample materials. For instance, we analyzed  $\delta^{13}\text{C}$  signatures of coral skeletons to evaluate whether these organisms were directly relying on  $\text{CH}_4$ . We found that the coral skeletons exhibited significantly higher  $\delta^{13}\text{C}$  values than the co-occurring AOM-derived carbonates, thus not supporting  $\text{CH}_4$  as an important carbon source. Rather, the corals were feeding on material suspended in currents.

3) In the methods please add section in which you describe the Experimental Design. How many samples were collected and from where? The descriptions of the laboratory methods are okay. However, I have no idea if you sampled thoroughly enough.

Response: we included more detailed information on our sample strategy and study design in the material and methods section.

4) In Table 2, will readers know what Identifier means? I realize that the numbers correspond to pictures in the figures. However, it is very confusing to have to put the figure next to the table to interpret the data in the table. There must be a better way to present the data.

Response: done. We replaced “Identifier” by “Identification number in Fig. 7”. In Addition, we added an additional column to the table in which we provide information on the analyzed material.

5) Rather than using code numbers for the sampling sites, it would help readers if you used descriptive names, such as ‘active seep’, etc.

Response: done. We have revised the use of code numbers throughout the

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manuscript.

6) Although amplicon sampling for microbial group is okay. Do you have evidence for microbial growth and activity? Perhaps in the discussion indicate which samples come from fresh material and are likely to have fresh DNA versus samples in which the DNA could be old and preserved. I realized this is inferred by looking at the pictures, but again this is a convoluted way to present a story.

Response: we have improved the information concerning the DNA material related to each sample in the manuscript, and we have specified the type of sample from which the DNA has been extracted (lines 155–158 in the revised manuscript). Furthermore, we added some extra information in Fig. 11 to clarify and remain the type of sample. DNA analyses cannot conclude if DNA is “old” or “fresh”, but we can estimate (together with other analyses) if the sample used for this analysis is fresh or not. but we can infer this by assessing the relative age and preservation of the analyzed sample. For instance, an AOM-derived carbonate recovered from an active pockmark (sample D10-R7) exhibits more DNA of AOM-related microorganisms (ANME and SRB) than oxidized AOM-derived carbonates recovered from regions that are currently not affected by seepage (sample D10-R3).

7) I suppose the model is okay. However, again a better presentation of the data might lead readers to the conclusion rather than relying on the author's story.

Response: done. We have modified the last paragraph of section 4.3. for a better understanding of our model (lines 398–405 in the revised manuscript).

Technical Comments from Referee n° 1

1) Line 19: consider saying, ‘rate a seepage via focused, scattered, diffused, etc.’

Response: done. We revised the sentence to “the type of seepage such as focused, scattered, diffused or eruptive”.

2) Line 34: change ‘which’ to ‘that’.

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Response: done.

3) Line 36: change to ‘typically, they thrive, etc.’

Response: done.

4) Line 45: change ‘ecological’ to ‘environmental’ and ‘are discussed to control’ to ‘influence’.

Response: done.

5) Line 51: delete ‘e.g.’.

Response: done.

6) Line 53: change ‘e.g.’ to ‘for example’.

Response: done.

7) Line 65: delete ‘i.e.’ and the parentheses. The text is not an example rather it is the description of ‘coral graveyards.’

Response: done.

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