

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.

Anonymous Referee #2

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This ms is a multidisciplinary investigation from a new research area of the links between cold-water corals and methane seepage, that adds considerable new data to the controversy, lending further support to the idea that cold-water corals are not nutritionally dependent on chemosynthetic methane or sulfur, but rather take advantage of methane derived carbonate deposits at seeps as hard substrate settlement. The ms finishes with a nice cartoon interpretation of the conditions of Gulf of Cadiz seeps and associated corals and seeps. The ms is well structured, explained and referenced, and has an adequate number of range of figures. Overall the data supports the interpretations, although I have one question about the inferences drawn from the delta C13 values of the coral skeletons (see below).

Detailed comments

Line 1. Title. The text after the hyphen: 'living on the edge' is unnecessary and adds nothing to the title. What edge? I suggest removing this.

Lines 26-27. Abstract Delta C13 values of the coral skeletons (see below)

Line 31. Abstract. Suggest 'seeping' rather than 'seeped' fluids.

Line 61. Suggest 'In addition' to replace 'On the other hand', as this is not a contrasting observation.

Line 76. 'Englobes' is not an English word. Seems like a transliteration of 'encompasses'.

Line 128. Don't start sentence with a number – spell it out.

Line 152. Can the authors give a little more detail of the nature of the samples used for the DNA work. Are these MDACs?

Lines 192-195. The background information about the Gulf of Cadiz isn't really results and would go better at the start of section 2.

Line 241 and other places. It's quite difficult at the moment to correlate the isotopic data in Table 2 with the sample points in Figure 7, because the specimen images in Figure 7 are not quite large enough to distinguish samples of authigenic carbonates from embedded coral skeletons. Therefore, could the authors add a column into Table 2 that makes it clear what the samples are for each of the isotopic data points, e.g. authigenic carbonate or coral skeleton.

Line 253. Replace 'stems' with 'comes'.

Line 254. In the figure the 'worms' look like serpulid worm tubes. Is this so? In which case please add this information.

Line 291. Replace 'On the contrary' with 'In contrast'.

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Line 296. Spell out '2D' at start of sentence.

Line 305 and elsewhere. What is 'dripping-like' seepage? This isn't a description I recognize, so it would be helpful if the authors specify what this means.

Line 317. Suggest 'data', rather than 'evidences'.

Line 330. I'm unclear where is being referred to here.

Line 332. 'appear', not 'appears', as preceding diapirs is plural.

Line 339. Typo. Angle not angel.

Lines 346-354. The authors here suggest that the seawater-like values of the delta C13 from the dead scleractinian skeletons and those embedded in the MDAC show that the corals do not use methane as a food source, either directly or through symbionts. The authors need to be careful here, because some seep organisms that demonstrably do use methane (and sulfide) from seep fluids for food via endosymbionts produce carbonate skeletons that also have seawater-like delta C13 signatures. I am referring here to vesicomid and bathymodiolin bivalves, that sequester seawater bi-carbonate ions to produce their shells. Using this model, having seawater-like delta C13 values in the coral skeletons does not prove that these animals do not use chemosynthetic food sources at the site. Really, to be able to settle this conclusively, authors would have to do isotopic, histological and DNA work on living corals from their site, not just on skeletal material and MDAC. In addition, it would be worth noting that scleractinian corals are found embedded in ancient seep carbonates too (see Goedert and Peckmann 2005); there may be some useful comparative isotopic data in that paper.

Lines 364-367. The entombment of coral skeletons by MDAC may have no consequence to corals, if they are already dead. It's not entirely clear from the text if the corals associated with the MDAC are dead or alive. If they are alive then this argument is stronger. Also, in most seep environments MDACs form in the subsurface where AOM reactions are occurring. Is this the case at this site? What proof is there of active

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MDAC formation at the sediment-water interface, as indicated in Figure 12? This is pertinent to the arguments in section 4.3.

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