

## ***Interactive comment on “Seafloor observations at Campeche Knolls, southern Gulf of Mexico: coexistence of asphalt deposits, oil seepage, and gas venting” by Heiko Sahling et al.***

**Anonymous Referee #2**

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This manuscript brings much needed exploratory work to the study of asphalt seeps in the southern Gulf of Mexico. Previous research in this area has focused solely on Chapopote Knoll. This study expanded into 11 additional sites in the Campeche Knolls to find widespread evidence of asphalt seepage in the region and provided detailed site descriptions of the geology and biology found at these new locations. This manuscript is thorough in laying the foundation for future deep-sea seep research at these newly-explored sites, and should be accepted for publication after minor revisions.

Comments:

1. I agree with Reviewer 1 that it seems incongruous for the title to have no mention of the chemosynthetic communities discussed in this study.

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2. The Abstract is too long and detailed to give the reader a concise snapshot of the study and should be condensed from three paragraphs to one.

3. It is odd that the tubeworms, which are frequently mentioned in the text and correctly identified as vestimentiferans, are not more specifically called *Escarpia* sp. until page 17 (late in the Discussion section). The depth at which these tubeworms were found combined with the genetic identification from Raggi et al. 2013 (cited in the manuscript) support the use of this genus in the manuscript. Several other common chemosynthetic megafauna are identified by species name in the text (e.g. *Bathymodiolus brooksi*, *B. heckerae*, and *Abyssogena southwardae*), so it is incongruous for the tubeworms to be identified by “vestimentifera” only.

4. Additionally, this means that the Campeche Knolls tubeworms are definitely a different species from *Lamellibrachia luymesii*, the species whose age was estimated in Bergquist et al. 2000. That study of the northern GoM species is cited here to estimate that the vestimentiferan-inhabited asphalt flows found in this study could potentially be decades old. The last paragraph of section 5.3 should more accurately state the species discrepancy (they are not merely “likely” a different species from the northern GoM study) and show caution in using this age estimate.

5. The Results section 4.1 “Gas emissions from the seafloor” may be better incorporated into the manuscript as part of the Methods section. This subsection does describe the results of the multi-beam echosounder surveys, but more importantly it describes how the authors used this information to trace the origin of bubble flares and choose sites for more in-depth AUV and ROV surveys. It then logically follows that the site descriptions and gas bubble samples obtained from those video surveys that make up the rest of the Results section were direct results of this decision-making process.

6. Figure 1 is very helpful in displaying different features of the southern Gulf of Mexico, but the gray and green dots meant to represent probable and definite seeps respectively are hard to distinguish. Although this color scheme is easier to differentiate when

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the area is magnified in Figure 2, the sites would be better served with different color choices.

7. Figure 3 is clear, but ultimately doesn't contribute much to the manuscript. The text description of identifying gas bubble plumes from multibeam echosounder seems sufficient to communicate the methods of the study to the reader and explain that plumes were not always traceable to the seafloor.

8. The dark blue box in Figure 4A showing the ROV survey area is difficult to distinguish from the background bathymetry.

Typographical errors:

- Last sentence of first paragraph of Introduction: "bolder" should be corrected to "boulder."

- Same issue in second paragraph of section 4.2.1 ("bolder" instead of "boulder")

- Last paragraph of section 4.2.2 (bottom of page 8): "loose buoyancy" should be corrected to "lose buoyancy."

- Last paragraph of section 5.1: "temporarily and spatially segregated" should be corrected to "temporally and spatially segregated."

- Last paragraph of section 5.3: I believe the authors meant "slow growth" rather than "low growth."

- First paragraph of section 5.4: Mictlan Knoll is misspelled as "Mictan Knoll" in the first sentence, and in the third sentence API gravity should be "slightly higher" rather than "slighter higher."

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