

Interactive comment on “Unveiling the Perth Canyon and its deep-water faunas” by Julie A. Trotter et al.

Anonymous Referee #1

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This is an almost very complete analysis of the Perth Canyon system, which describes accurately the chemical characteristics of the different water masses, biostratigraphic and palaeoecological characteristics of the system and the biological communities inhabiting this dynamic habitat. Additionally, it provides an accurate comparative analysis of the changing carbonate chemistry of the deep-sea habitats that occupy this canyon system. However, what is the role of the canyon on carbon cycling in the context of modern global climate change has been poorly discussed as well as other sections (i.e. section 3.4) that I believe that it would need to be more discussed in light of present studies on the topic. Also, I expected to read more on how the geophysical condition drives the biological systems. For example, I suggest attempt in the discussion to linking geological structures and water mass with community structure and species

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distribution (i.e. Baker et al. 2011, Robert et al. 2014, Brooke and Roos 2014). I also recommend reorganizing and shortened some parts of the manuscript (see my comments below), as well as improve some figures. In light of these comments, I suggest the manuscript be accepted after a moderate revision process.

Please find below several more specific suggestions: Pag. 4 Line 20-25. These are details of sampling methodology. I recommend moving this part down and slightly modified it. Pag 9. Line 9-13. Move to the Material and Method section and slightly modified it Pag 9. Lines 14-24 I think you need to move this text down and integrate into next section where the geological description of the dives is described. It is redundant in some parts. Pag13. Line 18-25. Please include the number of the figure or references that support this statement. Additionally, it would be interesting adding a brief discussion about how the eddies affect the productivity within the canyon (has have been observed in other canyons i.e. Amaro et al., 2017) Pag 15. Section 3.4.3. Could you explain the effect of the canyon on the carbon cycle a little more? There is still an important knowledge gap related to this topic on canyon ecology. Pag. 16-17. Line 26 al 16. Don't think most of this is needed, there is some information repeated below. I recommend delete some parts and move down the information you think is relevant and integrate into next section. Pag 17-18. Section3.5.1 I think that the structure of this section can improve and better describe the relation between topographic/hydrographic characteristic of the site and the community/species founded. For this purpose, I really recommend to modified Figure 14 including each transect and the photo with the main characteristics species or communities inhabiting the different geological structures within transects. Figure 2. I suggest deleting Figure 2 (not relevant data). Also, add the sampling point in Figure 1B. Additionally, I believe that the quality of Figure 1 can be improved. If possible, try to follow similar format within the Figures (i.e. regarding the position of the legend, the names of the categories, etc). Increase the size font of lat/long (not legible). I suggest including also north in the map. Figure 3 and 4. I would merge Fig 3 and 4, makes it easy for readers to quickly understand the dives characteristics (e. g. Figure map and 2 photos of each dive) Supplement Figures S1

and S2. It almost repeated from Figure 4. I would delete it. No new information is provided.

Below are some minor comments that deserve attention. Pag 1. Line 21. Changes CTD profiling for chemical Pag 3. Line. 1 Don't think sub-heading is necessary for Introduction. Pag5. Line 29. 10 subsamples from each site, is correct?. Please clarify. Pag 6. Line 1. Changes to "Vienna Standard Mean Ocean Water (VSMOW)" Pag 7. Line 29. 2.5 Add Stronium (Sr) isotope dating Pag 8. Line 8. Changes Stronium for Sr Pag.14 Line 31: Include; deeper depths Pag.14. Line 28. Delete "s" from FIGs Pag15-Line 1: Changes the sentences to "formation, suggesting that this material is most likely pelagic in origin. Figure legend 14. Acesta Italicize Pg 17. Line 25. Changes: "mobile megabenthos. Demersal.." Line 27 Changes Sea urchins Pag.16. Line 25. Changes; deep-sea fauna Figure 6. - I did not found the Small white squares representing the location of moorings in the Figure. Please include them. Please also include the north in the figure. Figure 7. Increase the size of the letters of the Figures and axis font. Figure 8. Include the north. Include in the legend; Small white squares represent the location of moorings (current meters and thermistor chains). Figure 9. The legend and colors of Figure 9A is not legible, increase the size Figure 13. Rename it appears as Fig 12.

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