

## ***Interactive comment on “Chemosymbiotic species from the Gulf of Cadiz (NE Atlantic): distribution, life styles and nutritional patterns” by C. F. Rodrigues et al.***

**Anonymous Referee #2**

Received and published: 1 February 2013

The Manuscript “Chemosymbiotic species from the Gulf of Cadiz (NE Atlantic): distribution, life styles and nutritional patterns” by Rodrigues et al. presents the distribution and dominant microbial processes used by symbiont-bearing fauna in the Gulf of Cadiz (GoC). The manuscript found that there was a diversity of different microbial metabolic pathways that fueled these communities and highlighted the differences among sites especially in regards to species composition. While the data presented is quite useful and exciting, the authors could do a better job of explaining how the results expand beyond the GoC, something that is possible from their research but would require a mild rewrite and some restructuring.

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The greatest challenge for this manuscript is getting it to transcend from a report of values and into a test of hypotheses with broader scale appeal than those working in the GoC. This is made more difficult by the numerous species and sites and variance in isotopic signatures - which cannot be avoided. However, if a series (or one) hypotheses was presented that could be tested with these data (trophic diversity is a function of species diversity; species richness is greater in areas where there is greater methane input as it allows methane to fuel symbionts in addition to thiotrophy, etc.) it would add not only to the broader appeal but also linearize the structure of the results and discussion making it easier to follow. The GoC is a very exciting place due to the close proximity of many seep settings and that should be stressed before the conclusions.

An attempt should be made to make the figures more interpretable as well. While there is a great amount of data presented in figure 1, it takes quite a bit of time to understand the patterns being presented. As an idea, species ranges by depth (species x-axis and depth y-axis) could be presented in a bar graph with carbon isotopic ranges for each species as a point with error bars over the top and its value on a second y-axis. That would allow the reader to quickly see what species were where and what that species was likely using as an energy source in relation to depth.

**Abstract:** The abstract does a good job of summarizing the findings. However the last sentence falls a bit flat as it doesn't really state how exciting it is to have this information on so many sites and species in a small spatial area. As a suggestion, I would state that these patterns highlight how trophic fueling changes on a small spatial scales with direct ramifications to seep communities and potentially biodiversity of margins.

**Introduction:** The introduction introduces the site and the background for the rest of the paper. What it does not do is place this study in a wider context other than understanding the GoC (Gulf of Cadiz). 15 mud volcanoes with many species symbionts bearing bivalve and frenulates means that the presented research of intra and inter specific relationships of trophic support could be used to get an idea of how small scale features and history (i.e. larval supply and survivorship) of a particular site can lead to

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increased diversity and trophic diversity – this is discussed later but should be here to get the reader in that mindset while looking at the results. If the symbionts are all eating different things then that is important or if the symbionts are all eating the same thing that is also important and that all pertains to niche overlap and competition which could be discussed to expand the appeal of the manuscript to a broader audience.

Results: It seems as if a discussion of mean isotopic signature among the different sites could provide some insight into the factors controlling the distribution of fauna and the trophic signatures (ignoring species specific isotopic signatures but just the mean of the sites studied).

Discussion: In general the discussion touches on all of the important points of the manuscript. However it is quite long and could be restructured to have better flow. There are many short paragraphs that seemed like they could be lumped into larger paragraphs based around ideas. The initial paragraph seemed almost like it should go at the end after the trophic introduction as it brought in a broader perspective than the later paragraphs. Having this near the end would also allow trophic relationships to be placed in context of the distribution of fauna. As a reader, it is easy to get lost in the names and values and places (which also have names) and to lose sight of the overall point of the study. Again this could be made simpler by having a more clearly stated hypothesis or hypotheses that this could be based around, allowing a more straight forward discussion.

Tables: Table 2 – the sample size should be given and “species code” should likely be the code given in figure 1 as that is the code that identifies the species. A separate identifier (e.g. site-species code) would be more appropriate for those numbers presented.

Figure 2: in this particular case – I feel that having the same axis on all plots is less important than being able see the points more clearly (i.e. ‘A’ is very clumped to keep the y-axis the same as on ‘C’ making it hard to see the nuances). The size of points on

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‘B’ are far better than those on the other panes and yellow should be avoided for points on a white background.

Specific comments: 17349 L6 – while the Review by Fisher is a good choice for this reference, I do not think that this particular work by MacAvoy et al (in this particular instance) is as good as the physiological studies at demonstrated the roll of symbionts to hosts – the MacAvoy work demonstrated it to the predators of the system. 17350 - Line 26 – might site for use of hydrogen for the same of Completeness. Petersen JM, Zielinski FU, Pape T, Seifert R, Moraru C, Amann R, Hourdez S, Girguis PR, Wankel SD, Barbe V (2011) Hydrogen is an energy source for hydrothermal vent symbioses. *Nature* 476:176–180 17351 – Line 24 “code names” should probably be “currently undescribed putative species” 17352 0 line1 – instead of different tissues state the tissues. Line 7 – reground rather than re-grinded Line 8 - shaken instead of shacked (which is not the past tense of to shake.) Line 10 – reground not grounded. Line 11 – specify which ea-irms and the word method can be removed, it is an instrument not a method. Page 17353 lines 8 on – when referring to depth (either shallow or deeper) indicate that it is sediment depth or water depth. Page 17354 line 17 – depleted in 13C – depleted in d13C is vague since that refers to the ratio of both isotopes (even though it is often treated that way in the literature). For both the most depleted and the most enriched individuals and sites (i.e. the part of the sentence after the semi-colon put in the mean value for that species at that site to be specific and save the reader from having to look in the table) line 21 – per mil sign needed after -36.8 L25 – showing instead of shoing Line 27 – when starting a sentence the genus should be spelled out even if it has been used previously. P17355 L8 and 9 – presented is not quite the right word. “had” would be better. P17358 L1-3 a reference would be good for this statement The words “many” and “most” are very often used throughout the manuscript – I would evaluate each one and decide if it is possible to replace them with the actual value rather than these vague descriptors. In addition, they are occasionally used twice in a sentence which is not necessary. Page 17359 – L15 - if one of the findings is that there is no difference among the foot and the gill then this needs to be tested statistically –

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would suggest a paired T-test and include in the methods and results beyond stating no difference. Line 20 signs are backwards. Lighter isotopic signature of methane is biogenic. P17361 L3 – The isotopic composition of methane in addition to the isotopic composition of the fauna should be stated whenever the former is available. L13-15 – sentence is missing a word or two “and the GoC has co-occurring and closely related species of both . . .” – also why is it interesting? 17362 – L5 – “may have factors other than this” L20 “very 'Missing a word' 15N” L29 of taking up and metabolizing

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Interactive comment on Biogeosciences Discuss., 9, 17347, 2012.

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