

Review for bg-2019-358

This paper represents an extremely important dataset and evaluation given our lack of understanding on abyssal macrofauna, deep-sea isopods, and future impacts of deep-sea mining. Concepts and methods aren't exactly new, but the data are and genetic vs. morphological comparisons are extremely important. The approach and methods are valid, and there are many good comparisons to other studies. However, the quality of presentation is lacking. The focus of different sections don't align with the title of the paper. There is a lot of unnecessary information, and not a clear structure. I suggest major revisions to the paper, reorganizing the introduction, results, and discussion to tell a clear story of isopod lifestyle and taxonomic ranges. The discussion and conclusion needs special attention as it is extremely difficult to read through.

General:

Misuse of commas throughout. Also other general problems with word usage such as adding/excluding s, verb usage, etc. Suggest having a native English speaker read through.

Abstract:

General: This abstract includes a lot of rather detailed results. I would suggest talking somewhat more broadly about adult life strategy in the distribution sentences, as your title states, rather than just copying results. Also there is no mention of implications for conservation in the abstract which is the other part of your title.

Lines 23 – 24: “The proportion of species present in a single area increased in this sequence...”
I do not understand what this sentence is trying to say.

Lines 27 – 28: “The CCZ areas show the highest number of shared species” Compared to what?

Introduction:

General: Your title states that isopods will be the focus of your study, but they do not come up in the introduction for several paragraphs and are only briefly mentioned. I think your second or third paragraph (at a minimum, although it makes sense to open with this as it is your title) needs to macrofauna, their use in conservation, and a little about isopods in particular.

General: The introduction is rather piecemeal and a bit hard to follow as it is now. It could be a little more concise and needs to be reordered, focusing on macrofauna/isopods, deep-sea mining, lifestyle, and conservation.

General: There is no mention of APEIs in the introduction. I would argue that one of the most important things in understanding species distributions is making sure that APEIs are protecting the same species that are being destroyed in contractor areas.

Line 37: change “becoming” to “become”

Line 37: Jones et al., 2017 discusses impact studies. I do not think it is an appropriate citation economic interests or advancing technology.

Lines 44 – 45: Why will the ecological footprint determine whether mining operations will be feasible long-term? Mining operations on land are extremely destructive but still take place. You may need a sentence or two here discussing the ISA's role as regulator and their dual mission to encourage mining and protect the environment.

Line 46: Recolonization kind of comes out of nowhere here. An introductory sentence along the lines of "As mining will completely destroy communities along large swathes of the seafloor, recovery will only take place through recolonization from surrounding areas." Or something like that.

Lines 46 – 50: Geographic distributions also greatly affect the likelihood of species extinctions, which are also important for conservation.

Line 61: Change to "reproductive strategies. These strategies"

Line 63: delete "with"

Lines 73 – 74: This sentence seems very cherry-picked. A superfamily is the most numerous and diverse crustacean taxon? Tanaids are generally more abundant than isopods. Seems like a very broad statement. Suggest changing to something like "Isopoda is generally one of the dominant taxa in abyssal benthic samples." Or something more general like this.

Line 80: delete "still"

Line 95: "This information would be essential for conservation planning." How? This really needs to be fleshed out as it is part of your title.

Materials and Methods:

Lines 105 – 131: This section is sort of all over the place. Sample collection and processing I get, but the first paragraph also includes a lot of information on databases while the second paragraph discusses outgroups. Suggest breaking up the first paragraph into two, and moving the outgroups section to molecular methods.

Lines 106 – 108: You need a map to cite here.

Line 108: APEI's kind of come out of nowhere here. As you talk about implications for conservation in the introduction, you should mention APEI's and the importance of making sure they are representative of the contractor areas. In theory, this is where recolonization may come from.

Line 117: Shouldn't it be "DISCOL"

Line 118: Do you have a DOI for the dataset?

Line 123: Delete “and specific”

Results:

General: The results are rather disorganized. It needs to flow more and have less repeats. It is also strange to have subheadings for a sentence or two. Suggest keeping section “Diversity by area” and having other sections such as “Shared species/similarity among areas”, “Family/species ranges”, “Beta diversity”, “Molecular data”. Your current molecular section includes shared species and diversity components as well. Not sure if the best way, but could also include a molecular and morphological component to each section instead of having a specific molecular section.

General: Suggest discussing families in order of expected dispersal potential in each section and stating this at the start. The different lifestyles are pretty much lost in the results.

Line 207: “clades with fewer samples” What exactly does this mean? Fewer than what?

Line 237 – 238: This is a repeat of above, don’t include in both places.

Line 286: Not exactly sure what “species abundance diversity” means.

Discussion:

General: Like above sections, the discussion is not clearly organized, making it hard to follow. Subsections would help.

General: For discussion points, start the paragraph with the main point and how your data support/don’t support this point. Then go into what other studies found.

Line 307: I have no clue what this first sentence means.

Lines 307 – 309: Not really sure the point of this first little paragraph. If your paper is attempting to establish a method for defining species, you need to talk about it throughout the paper, not just introduce it in the discussion.

Line 314: Need citation in place of “(citation here)”

Lines 311 – 317: This is a repeat of the introduction. Instead cite some studies that talk about lifestyles and dispersal of isopods.

Lines 311 – 338: You need to incorporate data from this study and previous studies more cohesively. May be easier to read if you have a paragraph for each of the families, from highest to lowest dispersal capabilities, starting each paragraph talking about what your data say about their dispersal and comparing that to their lifestyles.

Line 320: another “(citation)”

Lines 339 – 344: Interesting point, but doesn't really fit in with what you are talking about. Maybe have a section labelled "Taxonomy" or something to that effect with bits like this?

Line 345 – 349: Delete this section. Not sure why you would need to remark that a study in one specific area is not representative of global diversity.

Lines 350 – 364: The first sentence is kind of contradictory to all the things you say about isopod lifestyles earlier. Could include some of this in the taxonomy section mentioned above, but seems like unnecessary information except for maybe a sentence or two about sexual dimorphism.

Line 365 – 369: Interesting information, but is not really tied in with your work at all as it is now.

Lines 370 – 383: Start with your data first in a paragraph, then discuss others. Also not sure what lines 370 – 373 are trying to say.

Line 388: "more likely" what?

Lines 401 – 407: suggest deleting, what does shallow vs. deep comparison have to do with this study?

Lines 407 – 414: Again suggest deleting. This is really muddying up the story you are trying to tell.

Lines 427 – 431: This doesn't flow at all. Maybe have a section on each family like suggested for results?

Lines 438 – 446: Why are you ending with species distinctions and not even those in your data? May be good to have a discussion section on taxonomy like suggested for results.

End: You don't discuss implications for conservation really at all here. Is APEI3 good? Are many of these species at risk of extinction because of singletons? Does genetic differentiation vs. morphology tell different stories for regulators? Could you focus future work on the least highly-dispersed family as they are likely to be most impacted by mining? Etc. You need a paragraph or two at the end really tying this all together and telling people why it is important work.

Conclusions:

General: Conclusions are almost all other people's work, and much of it is taxonomic problems which don't seem to be the focus of this paper. What are the main points of this study (e.g., isopod lifestyle, CCZ similarity, etc.)

Lines 448 – 450: Now I am confused. This study is focused on taxonomic incompleteness? I thought it was focused on isopod lifestyle and ranges. You need to have the conclusion talk about the main points you are trying to make, and taxonomy isn't even in the title.

Lines 448 – 458: This is way too much of other people’s work for a conclusion in this paper. You can have a sentence or two about the need for more molecular work and morphological problems, but it needs to be shorter and not at the start, unless you want to change the focus of this paper.

Line 459: How do you know distance and locomotion are “most” important? You tested everything? What else did you examine besides distance and locomotion?

Line 460 – 461: “Long-distance populations... patchy/local populations” What does this mean exactly?

Lines 460 – 468: Again, your conclusion is almost all other people’s work. Need conclusions for this study.

Tables and Figures:

Table 1 should be supplementary.