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Biogeosciences Discussions



# *Interactive comment on* "Interannual variation in the epibenthic megafauna at the shallowest station of the HAUSGARTEN observatory (79° N, 6° E)" *by* K. S. Meyer et al.

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The scientific question on benthic dynamics related to changes in the environment and further questions on food-limitation are highly relevant. The results are totally new and the general approach of such (difficult) long-term observations is very rare and extremely valuable. Concerning the conclusions I would like to add one aspect. The authors attribute the changes of the megafauna to environmental changes and conclude that originally the system was food-limited. I do not have problems with this interpretation but I would like to attract the attention of the authors that this conclusion (and then results behind) is rather an exception and, thus, exceptionally interesting.

The deep-sea is (probably) food-limited but highly diverse and low in abundances. If in rare cases such systems are (artificially or naturally) fertilised diversity can increase at least theoretically (see e.g. E. Pilou) and when the iriginal or local diversity is not so high but in practice it happens often that immediately after an additional food input some species benefit more than all others and diversity decreases. Maybe the authors observed here a very narrow (time) window or phase of a scenario for which this theory can be confirmed. If the system studied develops further in the same direction we might expect soon the opposite. The authors might feel free to use this idea, which emphasises the uniqueness and, thus, the value of the results. The limitations of the study, especially those related to taxonomy and a perfect spatial overlap of areas in the different years reflects our actual possibilities and not a weakness of the study. Because I know that there is criticism on these two points, which is justified but occasionally totally misunderstood or simply over-emphasized I would like to state here that there is no study in the world that can claim for the absolute truth in species identification (even not when molecular technics are applies) and I do not know any study where at 1000m depth over a certain period of several years exactly congruent stripes of sea-floor area are revisited for such a faunistic/ecological survey. The authors discuss these limitations with great care, thus this is undoubtedly a serious scientific study. Statistics are up-to-date (with one minor question/problem mentioned below). Title correct. Abstract complete. Manuscript well structured and easy to follow. Language clear. Concerning references it could be added that the holothurian species Elpidia and Kolga are know to respond also in other areas quite obviously with probably successful reproduction/recruitment to changes in the environment.

Julian Gutt

Here are a few detailed points of criticism or hints that might help improve the manuscript: Page 18043: Even if indirectly indicated it should be clearly mentioned (once) that the laser beams were parallel. It should also be included that the lasers are fixed tot he rig with 90° to the sea-bed only under ideal conditions and only if the



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sea-floor is flat. The laser points are what is reflected from the sea-bed. These act as a scale in the image but sometimes this is mixed with the laser beams or laser pointers, the latter (to my knowledge being not an english native speaker) a term for a tool for presentations/lectures. Page 18044 Mesh size of AGT? I know BIIGLE but for non-specialists it should be mentioned at the beginning of 2.3 Image analysis that BIIGLE is a half-automatic taxa-identification system (or similar). Page 18045 I would list here all environmental parameters analysed in detail and not only mention "different biochemical parameters" Page 18046 According to PRIMER "discriminator species" are characterised by their contribution to the dissimilarity between groups, but in the manuscript the SIMPER routine is (only?) used to determine species which contribute to a good average similarity within groups. This is definitely not a discriminator species; if well defined it could be called a characteristic species but not in the sense that it is characteristic for a group in contrast to another group. As a consequence I would also not write later (18048) similarity between but similarity within... 18046 Is the 1st sentence necessary? If so, why not a time estimation for all analyses (maybe also sampling and writing)? Page 18047 What is a "natural group". Sentence "The MDS plot shows..." is unclear. Page 18049 the selection of the 11 species is opportunistic (most recognisable and reliable) but in 3.3 it is assumed that they are representative for the entire megafaunal community. There must be some good arguments mentioned, if not, there is a problem with (all?) generalisations but I hope this is not the case and just a justification is missing. Page 18056 4.3 1st sentence lower evenness than what? Second sentence unclear (same problem) higher than in 2007 than in the previous year. 2nd paragraph: the same problem higher than what?

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