

## ***Interactive comment on “The effect of salinity, light regime and food source on C and N uptake in a kleptoplast-bearing foraminifera” by Michael Lintner et al.***

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Thank you for your feedback. We cannot agree with you, that the experiments are not well designed to investigate targeted factors. Highly significant results were generated concerning the tested factors, which would be not possible if experiments were not well planned. Furthermore, we cannot agree with your statement of using inappropriate statistics. As described below, the usage of the term "marginal significant effect" for a  $p$  – value of 0.080 (significance level 0.05) may not correspond to some conventions but  $p=0.080$  is definitively a "trend" and so we can deal with this result. This "trend" allows us to speculate about the C uptake of foraminifera and therefore the accusation of

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overinterpretation/misunderstanding of the results seems inappropriate. Additionally, N uptake shows even a highly significant difference ( $p<0.001$ ) and therefore justify statements like "significant differences of salinity based food uptake". To avoid further misunderstanding, we clarified our statements in the discussion.

Major Points 1. The amount of food: The food (5 mg) was provided at the beginning of the experiment. At the end of the experiment there was enough food remaining in the dishes, otherwise the experiments would make no sense. Therefore, sufficient food was available for foraminifera during the whole experiment.

2. Food source: *D. tertiolecta* is very commonly and successfully used for feeding experiments in other studies (Lintner et al. 2020, Wukovits et al. 2018, 2017, Grabenstatter et al. 2013, Linshy et al. 2014, Nomaki et al. 2006, Heinz et al. 2002, Lee et al. 1961, ...). We use this algae for many years in our culture lab. In addition using *D. tertiolecta* enables us to compare quantitatively our results with previous studies investigating other species or variations with other factors. Please keep in mind, we assumed that both algae are not a preferred food source, due to the low uptake values in comparison to other tested foraminiferal species. We speculated, that this low uptake may be due to the unfavorable food source, but since no one has yet examined the food uptake of *E. excavatum* we cannot compare our values. Maybe *E. excavatum* has generally a lower uptake of food than other foraminifera. But we rephrased this in the discussion so it becomes clearer to everybody. Also, we would be very careful to use this  $pC$  and  $pN$  values as absolute values! We think the activity of foraminifera depends strongly on seasonal fluctuations.

3. Marginal significant effect As described in the introduction, we rephrased this part and changed "marginal significant effect into "trend".

4. Incorrect results description We corrected the mistakes and added the values to the text.

5. Data representation We changed axes titles as suggested by reviewer 2, although

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“time (d)” would be more consistent to other studies published in Biogeosciences. For Fig. 3 we can think about a replacement of the name. We think it is very confusing to plot all points. This way you would have 9 data points at a single x-value and this is not easy to read. All data would be provided as a supplementary file in the final published version. We produced a bar plot for the numbers in tab. 3.

Minor points We will check this PSU-problem and will than rephrase the paper. L 18/24/54/80/104/124/136/173/183/184/191/197/199/250/264/293/315/321/369/393: We corrected this. L 47: Morphological variability – we added this to the text. L 110: Illuminated, we added this in the text now. L 126: The calculation of the values is described in detail at 2.4. Isotope analysis L 133: We took foraminifera >150  $\mu\text{m}$  and only individuals which tests were totally filled with cytoplasm – we added this information to the text. L 137: Also a modified seawater has a salt concentration and therefore it would be ok to use salt concentration, but we adapted the text here. L 138: 15 PSU to the “Schwentinemündung” and 25 PSU to the outer Fjord. The information is now added to the text. L 139: We used fluorescence tubes from the incubator as a light source with 30  $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$ . The information is now added to the text. L 140/150: 5 mg/crystallisation dishes. The information is now added to the text. L 141: We know from other studies (not published by now) that after 1d you have no significant different food uptake by *E. excavatum* if you change the environmental parameters (light intensity, heavy metal concentration, ...). L 144/242/244: 16:8 is correct and was corrected in the text L144: We replaced the term “cells” by “foraminifera”. L 152: It is okay. We did not see any tests broken up due to osmotic shock. L 168 – 172: For background values, we used 20 foraminifera for one data point – also triplicates were done. These foraminifera were taken freshly from the main culture. These foraminifera were not incubated to prevent contamination of this individuals with isotopes! L 199: This is right – we adapted the text here. L 268: We rephrased this. L 272: We considered this point and changed “preference” into “uptake”. L 275 We proofed this and adapted this point. L 294: Yes, statistics was added. Section 4.2.: The second part was rephrased, maybe now it becomes more clearly. L 336: This part was also rephrased. But gen-

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erally, if individuals contain fewer plastids it does not mean that they have no plastids, therefore they can also represent the general feature of kleptoplasts with even fewer plastids. L 357: We treated it as a “trend”. But again, it will not change the interpretation of the results here. L 378: We adapted this part to your suggestions. Fig. 2: It was added to the caption. The error bars are deliberately shifted to avoid overlapping with the “light-data”. If you look carefully at fig. 1 it is the same and I think it is very useful to have more information about the error bars.

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