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Interactive comment on "Respiration of Mediterranean cold-water corals is not affected by ocean acidification as projected for the end of the century" *by* C. Maier et al.

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Reply to comments of referee #2:

Comment by Referee 2: "I appreciate there are differences in experimental design between those outlined in this paper and that of Maier et al., 2013 however I agree with Reviewer 1 that combining the data of these two trials would have given a more rounded view of what is going on."

Answer: This was exhaustively answered already in our response to referee comment #1. We can only stress once again, that the relevant parallel data for calcification have been included in the present paper and that therefore the view was "rounded up".

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Comment by Referee 2: "To my mind a measure of food availability in their natural habitat would be very important to base experimental feeding rates on. Having more or less food than they are used to will potentially alter their response to pCO2 treatments – being 'happy' is not a good reflection of the real world scenario. I agree with the first reviewers comment"

Answer: We agree that the term 'happy' is not a good terminology, but it was introduced by referee #1, which we thus kept in our reply to this referee. Also, the referee should have more carefully considered our answer already given to referee comment #1. But may be the referee is not familiar with experimental design (and their acceptable constraints). So we voluntarily elaborate in more detail: There are always constraints with respect to experimental design as it is difficult to mimic the real environment. This is a known and accepted confinement in scientific experimental approaches. In principal, it is sometimes desired that other parameters, except the factor being studied, can be kept constant between treatments to exclude other - in nature - occurring variations (temporal and spatial) that may actually mask an organisms response to the factor studied. Therefore these factors are being maintained consistent between treatments and with the assumption that they would not mask a response with respect to the factor altered (here pCO2). This is an assumption one has to make in experimental design and is a valid approach used in all experimental studies. With the comments made by referee 1 and 2 on the "masking effect" of food not corresponding to real world scenario, it would never be possible to conduct any experimental work and to accept the results provided. And again: with the experimental repeated measures design we used, we could show, that there is variation over time in respiration (and calcification), but this repeated measures design also allowed to show, that this variation was not due to pCO2. It also showed, that despite this array in response (concomitant increase or decrease of respiration) there was for none of the repeated measurements an effect of pCO2. So, if there would be a "masking" of the response, one may expect at least an effect at lower or higher respiration rates. The approach we used is therefore a valid experimental approach (and was even more tedious as most approaches that measure

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only once a certain response).

Last but not least: there is to date no quantitative assessment of food available to cold-water corals as this is an extremely challenging task – and even if food availability would be known, this still would not reflect, what a coral can take up in nature and in the lab as current speed and 3-dimensional structure etc again differ greatly between nature and what can be mimicked in the laboratory. To date only some qualitative studies on the potential food sources are available and are actually based on indirect evidence: stable isotopic analyses of coral tissue! So, for present, we can conclude, both referees ask for the impossible, and are quite unrealistic with respect to experimental design, when commenting on the issue of the need to provide food like in the real environment during laboratory experiments.

Even for shallow water organisms the food available in the environment is, in the majority of studies, a neglected issue. Certainly, a pre-requisite is to provide sufficient food (unless starvation is addressed) to avoid the organism to suffer and assuming that the organism does not "overfeed" taking up the food it needs and is able to metabolize.

We would also like to stress the point, that except for one other study (Form & Riebesell, 2012), most studies use a pseudo-replicated design (with maintaining corals in the same tank), while we took the effort to keep coral fragments in single maintenance vials, which is much more time consuming with respect to maintenance work (cleaning and feeding) and set-up (construction of single vials, providing aeration and flow through in each single vial).

Interactive comment on Biogeosciences Discuss., 10, 7617, 2013.