

Biogeosciences Discuss., referee comment RC3  
<https://doi.org/10.5194/bg-2021-61-RC3>, 2021  
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## Comment on bg-2021-61

Anonymous Referee #3

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Referee comment on "Will daytime community calcification reflect reef accretion on future, degraded coral reefs?" by Coulson A. Lantz et al., Biogeosciences Discuss.,  
<https://doi.org/10.5194/bg-2021-61-RC3>, 2021

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### General comments:

This is a timely study that discusses the possible divergence between estimates of NEC and reef growth in degraded coral reefs. The authors provide an interesting perspective that thermal enhancement of calcification in other benthic members may highly influence NEC, especially in reefs where coral cover is low.

The limited amount of nighttime NEC measurement is a weakness of the study. Nighttime dissolution could significantly influence the 24 hours NEC signal, especially if other benthic groups are contributing substantially to the calcification signal. The authors do a good job discussing this issue in the "future considerations" section. However, the lack of these data could have influenced the conclusions of this study.

There are important information missing in the main text while the SI is too long. Authors could change the structure of the paper by including some sections of the SI (e.g. S2.2.) in the main manuscript.

Overall the paper is well written but there are some references and details missing which are highlighted in the specific comments.

### Specific comments

#### Abstract

L 23- erase coma after other.

#### Introduction

L83-86- The authors should be more specific here by including the changes in coral cover after the bleaching event (from 7.1% to 5.8% coral cover).

L88-94- Authors should mention that in the same paper, Kayanne also observed decreases in NEC following a bleaching event and decreases in coral cover in Palau.

#### Materials and Methods

L 159-170- Authors need to provide more details about NEP and NEC calculations. This section is oversimplified specially compared to section 2.1. This information needs to be in the main manuscript, not in the SI.

Why are nighttime measurements not included in this section?

Discussion

L253-255- The authors previously mentioned that the NEP values were not included for the slack-water approach given the large source of error in air-sea oxygen exchange. Therefore, they should not consider this data in the discussion.

L 259 -Again, authors should mention the contrasting results reported by Kayanne et al 2005 between the Palau and Japan studies.

L 322-329 -This information is not accurate. Courtney et al did not **find** that the dissolution signal was a major driver of the 24-h zero NEC signal during bleaching. They **Hypothesize** that reductions in NEC could influence carbonate dissolution and they link this hypothesis to the zero NEP observed during bleaching. Please, make the appropriate changes.

Overall, I agree with the main point of the paper that NEC measurements may no longer be a good proxy for reef growth in degraded coral reefs. However, this is especially true for daytime measurements. During daytime, other benthic groups such as algal turfs, which are becoming more frequent as reefs degrade, can highly influence the metabolic signal of the reef. For example, Romanó de Orte et al. (2021) recently showed that, during daytime, algal turf communities have similar calcification rates than live corals. However, during nighttime, while corals are still net calcifying, algal turfs are net dissolving. This would likely influence NEC during a 24 hours cycle. It is crucial to have robust nighttime NEC measurements in order to access changes in NEC during bleaching events. Further, the algal turf calcification during daytime could also help explain the discrepancies described in L343-364.

L 360 Erase "be"before influence