

Comment on bg-2021-137

Anonymous Referee #2

Referee comment on "Reviews and syntheses: Spatial and temporal patterns in seagrass metabolic fluxes" by Melissa Ward et al., Biogeosciences Discuss.,
<https://doi.org/10.5194/bg-2021-137-RC2>, 2021

This study aims to identify drivers of change within submerged vegetated habitats through a meta-analysis of seagrass ecosystem metabolism from studies reporting productivity using oxygen as a proxy for carbon fluxes. While this eventually could be a very useful paper, the manuscript has too many flaws to be accepted in its present condition.

(1) The study has omitted large parts of the literature on seagrass productivity, there are several other, very important studies, many reporting O_2 dynamics (especially in the older literature). And why report only oxygen evolution studies? There are also reports from other methods, like e.g. Tokoro et al that measured CO_2 directly, or in situ PAM work, like e.g. Gobert et al 2015, and references therein.

(2) The comparison between enclosures and other methods is tricky. At lines 124-126 the authors write: "In contrast, measurements of NCP taken over longer time periods or that incorporate the full 24 hour cycle (full-day NCP) provide insight into the cumulative effect of seagrass on seawater chemistry"

This might not be true (for enclosures) since it has been shown that incubations as long as 24h might yield very low values as the chamber effect will be considerable. Thus these studies might have been severely underestimating productivity. (Olive et al 2016)

(3) Overall the authors neglect to account for any changes in seawater carbonate chemistry. Especially calcification (very important in many tropical areas) is forgotten. The formation of $CaCO_3$ have been shown to decrease pH and force CO_2 from the water to the atmosphere. However, some researchers suggest that the net effect of increased productivity and calcification has a positive effect on the overall productivity within the system. This must be discussed properly, a good starting point for such a discussion could be found in e.g. Gattuso et al 1995, Frankignoulle et al 1995 and Mazarrasa et al. 2015.

I suggest that the manuscript is rejected, but invited for resubmission in an extended and reworked version.

Suggested references

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