

Reviewer #2

This is a well written and very valuable overview of mesocosm approaches to OAE studies, with important information and considerations that should (need) to be accounted for in future studies. The authors should be commended for providing a clear overview. There are a few technical issues to be addressed, only minor suggestions to change wording slightly to clarify meaning and to ensure that key points are made clear.

Response: On behalf of my co-authors I thank Alex for this positive and constructive review. See our point by point responses below.

Ln 16: 'realism' – This seems unnecessarily contentious; mesocosms are indeed far nearer 'reality' than microcosms and cultures due to their inclusion of a more representative portion of the ecosystem, but it is only a portion. This is clearly reflected in latter parts of the review so a more appropriate term or just leaving it at 'biological complexity' may fit better in the abstract (e.g., 'By combining representative biological complexity with controllability and replication..').

Response: We agree with the reviewer and will delete "realism".

Ln 42: rather than 'poorly realistic', 'unrealistic'?

Response: We find the term 'unrealistic' too strong for laboratory culture experiments and would prefer to stick with our wording.

Ln 123: 'relevant information in the context of regulatory considerations' – another important strength (of the gradient approach) is its utility to model parameterization in terms of functional responses of organism physiology and ecosystem function.

Response: We thank the reviewer for this suggestion and will incorporate it in the revised manuscript.

Ln 204-205: 'the time for equilibrium may differ for pelagic and benthic habitats' – is variability in the equilibrium time for different ecosystems and seasons another consideration that needs to be made?

Response: We agree and will expand on this in the revised manuscript.

Ln 281: '...)' – seems unnecessary to extend the list here.

Response: Agreed. Will be deleted.

Ln 356-357: It is not clear whether the authors mean rain ratio (PIC:POC) or sedimentation rate in this line. Based on the rest of the paragraph it is likely the former but this line is unclear. Please clarify and rephrase.

Response: Point well taken. Will be clarified.

Ln 364-367: Are the thresholds given here, based on 'Environmental Quality Standards', international or will they vary depending on regional authority?

Response: Will be clarified.

Ln 396: Can the authors give some examples of the inert materials that should be considered?

Response: Will be added in the revised manuscript.

Lns 407-414: These recommendations are really important to the fledgling field of OAE research; should they be incorporated into the abstract to ensure they are taken up by the research community? The fourth (transferability) and sixth (feedstock) are essential for the community to ensure consistent and value-for-money OAE research that advances the field rather than causing confusion.

Response: In our concluding sentence of the abstract we refer the reader to the recommendations at the end of the paper. We believe that too many of the recommendations are important to the OAE research community and decided against highlighting specific ones in the abstract.