

Anonymous referee #1 Comments

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

I highly suggest the authors consider re-outlining the Introduction as it will help focus the details of this key section of the manuscript and further highlight the significance of their work. Many of the paragraphs in this section currently read as though they are each the "first" paragraph in an Introduction, rather than a series of connected ideas. I wholeheartedly agree with the authors that having baseline metabolic and benthic community composition data from a relatively pristine coral reef ecosystem is important, but the "why" in relation to compounding environmental/climate stressors and/or the need to compare to ecosystems with different benthic community composition is somewhat lost when interpreting through these seemingly disjointed paragraphs and often repeated but vague statements about biogeochemical cycling and metabolism within reef ecosystems. That said, clarity and details in the Methods, Experimental Results, and Discussion sections are much improved and provide an appropriate level context for the study.

Line Edits/Comments/Technical Corrections

Summary of Intro P1: Stressors causing changes in reef ecosystems?

Summary of Intro P2: Ecosystem services provided by modern reefs?

Summary of Intro P3: Capturing metabolism in coral reef ecosystems?

Summary of Intro P4: Calcification on reefs and the threat of OA?

Summary of Intro P5: Back to metabolism on reefs?

Summary of Intro P6: The important roles of benthic algae in reef ecosystems?

Summary of Intro P7: Influence of reef metabolism on seawater chemistry?

Summary of Intro P8: Uniqueness of the opportunity to study the Kimberley Bioregion of NW Australia?

We appreciate the reviewer's feedback regarding our MS and appreciate their time in providing comment. As suggested, we have re-outlined the introduction (see below). We feel this has resulted in more focus and better-connected ideas in the re-written introductory section.

Summary of Intro P1 - Ecosystem services provided by modern reefs/Stressors causing changes in reef ecosystems

Summary of Intro P2 - Calcification on reefs and the threat of OA

Summary of Intro P3 – Reef metabolism

Summary of Intro P4 – Algal contributions to reef metabolism and calcification

Summary of Intro P5 - Uniqueness of the opportunity to study the Kimberley Bioregion of NW Australia and study outline/goals

Line 41: “current” rather than “currently”?

We have made the suggested edit.

Line 43: Citation for the impacts of “recurrent large scale weather events”?

We have included a citation and reference to Moore et al., 2012 to address large scale weather events such as marine heat waves.

Lines 41 - 47: A lot packed into this sentence; consider breaking up and refocusing. Also, a bit unclear on the link between eutrophication, sedimentation, and increasing SST and OA. I think breaking this sentence up could help with this though.

We have spliced and restructured the sentence and it now reads “With the current unprecedented rate of environmental change, coral reefs face growing pressures. These include localised eutrophication (Hewitt et al., 2016) and sedimentation (Hughes et al, 2017a), to larger scale recurrent weather events (marine heat waves, etc; Moore et al., 2012), and rising atmospheric greenhouse gases (especially carbon dioxide, CO₂; IPCC, 2014) resulting in increasing ocean temperatures (due to atmospheric heat absorption) and ocean acidification (OA) (Hoegh-Guldberg, 2007; Doney et al., 2009; Perry et al., 2018).”

Lines 52 - 57: Shouldn't these sentences come before ecosystem services are introduced in the last sentence of the preceding paragraph?

We have moved lines 52 – 57 up into the preceding paragraph as suggested.

Lines 64 - 66: The way this sentence is written is counter to lines 71 - 75.

We have re-written the introduction to address these comments.

Lines 71 - 75: Adding the timescales (i.e. seasonal, annual, etc.) over which reef flats are generalized to be net sources of CO₂ to the atmosphere may help reconcile this statement with the “high” calcification and production rates mentioned above.

We have re-written the introduction to address these comments.

Line 306: Rogue comma.

We have removed the comma.

Line 309: Space needed between 34.8 and ppt.

We have added a space before and after 34.8 ppt.

Lines 313 - 314: Check subscripts and superscripts.

We have adjusted the sub- and super-scripts in the sentence.

Line 355: Rogue underscore?

We have removed the superfluous underscore.

Lines 378 - 396: Not sure if this paragraph is well-positioned here. A lot of the statements in this paragraph read as site descriptions that may serve a stronger role in the Methods section when introducing Browse Island. Additionally, the "general" discussion of the influences of production and calcification on ambient seawater chemistry has already been brought up in the Introduction.

We have moved some of the relevant text into the conclusions as it seemed a better fit there. The text already covered in the introduction has been removed.

Lines 398 - 417: I think this is a much stronger starting paragraph for the Discussion section.

We appreciate this feedback.

Lines 413 - 417: Run-on sentence. Consider a full stop after "elsewhere" and starting a new sentence with "For example..."

We have divided the sentence in to two parts as suggested.

Line 415: Rogue space after O2.

We have removed the superfluous space after O2.

Lines 448 - 453 (and throughout): Be mindful of run-on sentences.

We have divided the sentence in to two parts as suggested.

*Lines 453 - 455: "... or use of radioisotopes *was* limited."*

The sentence has been changed to "...or use of radioisotopes was limited."

Lines 584 - 586: Repeated in 586 - 587.

We have removed the repeated sentence from the text.

Figures 3, 4, and 6: Axes are unreadable/corrupted.

The text in the axes being difficult to read was a function of the size to the figures. We have increased the size slightly and this seems to have alleviated the letters being squished together resulting in text that is more legible.