

Considerations for determining warm-water coral reef tipping points.

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Review 5th November 2024 Lyndon DeVantier

LD: The authors have adequately addressed the points raised in my previous review. I have few remaining concerns, as here below.

Abstract and 2. Considerations for assessing coral reef TPs

Towards the end of these sections, consider including / expanding sentence(s),

a) noting that some predicted TPs have already been exceeded (albeit briefly), and that change is happening at rates faster than previously predicted, as outlined in section 14.

(b) the Abstract could also include the point that the multiple stressors are a powerful selective force – genetic bottleneck - driving significant population reductions and rapid acclimation of surviving corals (including shuffling of microbiome components) and via reproduction of survivors, the evolution of coral holobionts. The results of acclimation and adaptation will be population, species, habitat and region specific. Such evolution may, or may not, alter both the onset and rates of impact of TPs.

5. Ocean acidification

Line 184: Typo... material due to decreases **in** saturation state of CaCO₃ ...

6. Deoxygenation

Line 230: Include sentence with more information and reference(s) to prior influence of deoxygenation in mass extinctions. Eg.

Intensified Ocean Deoxygenation During the end Devonian Mass Extinction

[Jiangsi Liu, Genming Luo, Zunli Lu, Wanyi Lu, Wenkun Qie, Feifei Zhang, Xiangdong Wang, Shucheng Xie](#)

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Also consider noting the apparent irony that elevated SST and irradiance cause zooxanthellae to produce too much oxygen internally, causing toxicity to the coral host, while deoxygenation also linked with high SSTs causes deprivation.

9. Pollution & disruption

Line 308. Include sentence noting that overfishing is also linked with COTS outbreaks. See eg.

Babcock RC, Dambacher JM, Morello EB, Plagányi EE, Hayes KR, Sweatman HP, Pratchett MS. Assessing Different Causes of Crown-of-Thorns Starfish Outbreaks and Appropriate Responses for Management on the Great Barrier Reef. PLoS One. 2016 Dec 30;11(12):e0169048. doi: 10.1371/journal.pone.0169048. PMID: 28036360; PMCID: PMC5201292.

12. Reef impact example

Line 346: "... sponge *Cliona* spp (Sheppard et al., 2020) and almost no larvae were seen in these areas."

LD: most coral larvae are not visible to the naked eye. Replace with ' ... no larvae were recorded' or 'no coral settlers were seen', depending on the original paper's findings and wording.

Line 349: "...Both sedimented surfaces and turbid water are hostile to larval settlement and none were seen in such areas over many hectares"

LD: Rather than 'hostile' and 'none were seen', consider 'not preferred conditions for larval settlement, with no juvenile corals recorded ...' if this better matches the original paper's findings.

14. Resilience and adaptation

LD: consider renaming this section as **14. Resilience, adaptation and refugia**

Line 398: Need to complete sentence: "Kleypas et al., (2021) provide a blueprint for coral reef survival and state that existing conservation measures such as marine protected areas and fisheries management are no longer sufficient to sustain reef ecosystems and many additional and innovative actions to increase reef resilience are needed."

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