



EGUsphere, author comment AC2  
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## Reply on RC2

Chloe Carbone et al.

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Author comment on "Early life stages of a Mediterranean coral are vulnerable to ocean warming and acidification" by Chloe Carbone et al., EGUsphere,  
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**This manuscript describing and discussing the effects of thermal stress and acidification on larvae and juveniles of the mediterranean coral *Astroides calyculus* is mature and well written.**

We thank the reviewer for his/her kind words and reply to his/her comments below. The comments are in bold while our reply is in plain font. Line numbers mentioned below refer to the revised manuscript.

**I am very close to "accept as is" but I see two very minor points that could deserve some attention.**

- **At l 36, you refer to Garrabou et al. about "temperate corals". My understanding is that a large part of the database from Garrabou et al, is likely gorgonians (and actually Garrabou et al. refers to a Cnidaria category). I may be wrong, but if it is the case, I would recommend to clarify which "corals" are in this group as it can be easy to interpret "corals" as scleractinian corals. So a little clarification may be welcome.**

We agree with the referee. We have clarified the relevance of Garrabou et al. for our study. We also replaced this reference by their recently published article from the same first author that is more detailed.

Lines 34-36: "Mediterranean anthozoans, including scleractinian corals (6 species) and gorgonians (7 species), have been suffering regular mass mortalities due to the increased intensity, duration and frequency of marine heatwaves (Garrabou et al., 2022)."

- **Also, and it is not absolutely necessary, but I am missing a few words about how Mediterranean/temperate ecosystems are distinct from the tropical corals ecosystems. Without doubts, some of the mechanisms can be generalised to both tropical and temperate ecosystems, but in addition to these, I would be curious to know if some stresses (or future scenarios) are more affecting temperate or tropical ecosystems. I believe these ecosystems are very different, so I would expect some unique responses too. (maybe one or two sentences in the introduction and discussion could be an idea.**

Too few studies have been conducted with temperate corals in early life stages in order to

generalize a difference between tropical and temperate species. In the discussion part, the results of this study have been compared with the tropical coral studies and the trend of the responses are equivalent. A sentence has been completed at the end of the Discussion in order to underline that our temperate coral has, in general, similar responses to tropical corals early life stages.

Lines 320-321: "Temperature acts on larval development while pH acts on the linear growth and calcification of the recruits as observed in previous studies on tropical species (e.g. Albright and Langdon 2011, Chua et al., 2013)."

However, under the double warming and acidification treatment a difference has been observed between *Astrodes calyculus* and the tropical species which has been emphasized.

Lines 292-298: "The proportion of settlement of *A. calyculus* larvae was significantly lower in the warm temperature and low pH treatment. In contrast, other studies reported no effect of such treatment (e.g. Anlauf et al., 2011, Foster et al., 2015). This difference can be explained by the higher magnitude of the warming and acidification treatments used in the present study compared with other studies (+ 3 vs + 1-2°C and -0.3 vs -0.2 pH) (Anlauf et al., 2011, Chua et al., 2013, Bahr et al., 2020). Furthermore, all previous studies focused on tropical zooxanthellate corals which obtain additional energy by photosynthetic products translocated from their symbionts (Davy et al. 2012) as well as are subject to relatively uniform seawater temperatures (around 25 to 29°C), which differs with the high seasonal temperature variability of the Mediterranean (14°C in winter to 26°C in summer in Ischia)."

Regarding adult coral, a sentence in the Introduction compares tropical and Mediterranean response to low pH.

Lines 37-38: "However, temperate corals seem to be more tolerant to ocean acidification than tropical corals as their calcification is rarely affected by low pH (Rodolfo-Metalpa et al., 2011, Carbone et al., 2021)."

- **Finally, and this is rather a proofreading type of comment, at l. 81, please add a space in *A. calyculus*.**

Done.

**It was a pleasure to review this manuscript at this mature stage and I look forward to see it published.**

Thank you!