



EGUsphere, author comment AC1
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Reply on RC1

Chloe Carbonne et al.

Author comment on "Early life stages of a Mediterranean coral are vulnerable to ocean warming and acidification" by Chloe Carbonne et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-240-AC1>, 2022

We thank reviewer #1 for his/her assessment and are pleased that s/he found the manuscript excellent on all criteria. We 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.

- **"growth" may refer to many processes, please always specify whether you mean linear extension, or calcification (net or gross?), or polyp budding**
- **I have one comment left to improve clarity. As I mentioned in the initial submission comments, growth is a too general term and can refer to many aspects of coral biology. "Skeletal "growth" is commonly defined by the equation "net calcification rate = linear extension rate * skeletal bulk density". The whole three parameters make up "skeletal growth", and since they may display very different response to the same environmental variation, it should always be specified what particular aspect of growth the authors are referring to. Also make sure to be clear whether you refer to skeletal growth or to the production of new polyps in a colony, This applies widely to the introduction and discussion.**

As suggested, "growth" has been replaced by (1) "Linear extension" when speaking the extension of the surface of the polyp base is discussed (lines 18, 81, 215, 251, 272, 276, 285, 305, 320) and (2) "budding" to describe the formation of new polyp (lines 18, 81, 252). "Growth" has also been replaced by "calcification" when appropriate (lines 307, 308).

- **add scale bar to each figure of a polyp/skeleton**

In the revised manuscript, scale bars have been added to Figure 4.A. and in the supplementary materials in Figure S2, S3, S5 and S6.

- **Abundance and polyp number per colony of this species were also measured in the field under OA, and the results of this laboratory study should consider those findings which mainly seem in agreement.**

Yes. This is right. Teixido et al (2020) measured abundance and polyp number per colony in the field at the CO₂ vent system and reference sites with ambient pH. The authors found that *Astroides calycularis* was abundant (around 50 % of cover at 1 m depth) and

colonies had fewer polyps at the CO₂ vent compared to the colonies from reference areas. In the present study, only the recruits in the warm temperature – ambient pH treatment exhibited the highest number of polyps per colony with a mean of 1.33 polyps per recruit after 9 months. However, this result was not significant. We think that the overall low number of polyps found in this study may make difficult a clear link with the natural population structure in the field. However, following the reviewers' suggestion, we enlarged the concept of polyp' tissue retraction and skeletal density (see below) due to low pH in laboratory conditions and in the field. Polyp' tissue retraction found during our laboratory study may be linked with the reduction of coenosarc tissue found in the colonies at low pH in the field. These similar patterns of tissue reduction may be a common response to low pH with implications for calcification.

- Lines 282-287: "This phenomenon of being more predisposed to dissolution may be compared to the loss of coenosarc (the living tissue connecting the polyps) in adult colonies of *Astroides calycularis* that naturally occur in a CO₂ vent site in Ischia, where seawater is naturally acidified (Teixido et al., 2020). As a response to low pH, colonies in the CO₂ vent showed a reduction of coenosarc compared to ambient pH sites. Interestingly, while the linear extension and structure of the skeleton were affected by low pH, the density of the skeleton was higher. These results are in accordance with the higher density observed on adult colonies living in the CO₂ vent site in Ischia (Teixido et al., 2020)."
- **Also I recommend a spell checking, e.g. Carroselli at line 70 is misspelled.**

This misspelling has been corrected and the spelling of all authors has been checked.