

# ***Interactive comment on “Mineralogical response of the Mediterranean crustose coralline alga *Lithophyllum cabiochae* to near-future ocean acidification and warming” by Merinda C. Nash et al.***

## **Anonymous Referee #3**

Received and published: 20 July 2016

This study tests for alteration of skeletal minerology in a Mediterranean crustose coralline alga cultured under elevated temperature and pCO<sub>2</sub> conditions. The authors measured the Mg content using XRD in skeletal materials cultured under four treatments: (1) ambient temperature and pCO<sub>2</sub>, (2) elevated temperature and ambient pCO<sub>2</sub>, (3) ambient temperature and elevated pCO<sub>2</sub>, and (4) elevated temperature and pCO<sub>2</sub>. They find that temperature but not pCO<sub>2</sub> influences Mg incorporation into the skeleton. While the temperature influence on Mg in alga skeleton is a well-established relationship, the absence of a pCO<sub>2</sub> influence on Mg incorporation indicates that this species of alga may be able to buffer against future ocean acidification. While this is

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an important outcome, I find the discussion and resulting conclusions extrapolating beyond what can be inferred from the results here. In some places, it would be relatively straightforward for the authors to provide additional evidence to support or refute their discussion points. I am also concerned that there was no independent verification of material growth in culture to ensure that only cultured skeleton was analyzed for the current study. Based on these two points, plus a few minor specific comments below, I recommend revisions to this manuscript prior to publication.

#### Specific comments

L76: an increase in Mg content under increased temperatures is well established in the literature and does not need to be tested here

L78: typo

L103: I am not familiar with the gross growth morphology of this species of alga. It is difficult to understand the difference between the new crust and the surficial crust. I appreciate that the authors included visualization in figure one of the different crusts but I would suggest they include a cartoon or sketch to better show the different crusts and how they differ.

L105: Is there any evidence that this new material was grown during the experiment? Was growth not measured or a skeletal stain used to mark new growth? Much of the results depend on this presumption and I think evidence to support is needed.

L 109: Again, please confirm that material sampled for XRD was grown under cultured conditions

L130-156 Present results here in the same order as presented in the methods L103 – 107

L171 – 175: It would be useful if this discussion was expanded to be consistent with depth of discussion elsewhere, or the differences between these crusts types and calcification processes better introduced earlier

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177: Analyses of the pre-existing thalli (main thalli) provides a baseline Mg content only if analyzed prior to the experiment, otherwise, analysis of the thalli provides baseline Mg content for experimental conditions.

L209: What does NBS and NCC stand for?

L210: is the second sig fig significant here?

L212 – 214 this could be tested using SEM

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Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-160, 2016.

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