Review of von Dassow et al.

The presented manuscript addresses an important and timely topic within the research area of ocean acidification and the associated impacts on coccolithophore physiology and distribution. The coccolithophore *Emiliania huxleyi* exhibits several different morphotypes which commonly are negatively affected (in terms of growth and calcification rate) under high CO2/low ph conditions. However, a highly calcified strain/ecotype has been repeatedly observed in high CO2/low pH waters like the upwelling region off the coast of Chile. This observation has led to the question if there are certain strains of *E. huxleyi* which present a high resilience against ocean acidification scenarios or even might profit from low pH waters. While strain specific physiological reaction norms have been reported, it is unclear how the highly calcified strain of E. huxleyi, present in low pH waters offshore Chile, responds to ocean acidification scenarios.

The study of von Dassow et al. gives important and crucial answers to these issues. The used methods are appropriate for the goal of this study and the text is well written and transfers the main message to the reader. Therefore, I recommend publication in BG after addressing some minor comments and suggestions.

Comments and suggestions:

1. The use of the term “ocean acidification”.
   In the manuscript the differentiation of seawater carbonate chemistry alterations by ocean acidification, upwelling and artificial laboratory manipulation is sometimes not clear and the reader might get the impression that these terms and processes are equivalent to each other.
   The term “ocean acidification” describes the ongoing process of decreasing surface ocean pH induced by anthropogenic carbon dioxide. This global process can be simulated in the laboratory by artificially altering seawater carbonate chemistry. Therefore and strictly speaking, in the laboratory the effects of changing seawater carbonate chemistry are tested. The gained results, however, can be related to ocean acidification but a careful differentiation should be considered.

   For example:
   Abstract on line 28:

"Ocean acidification affected coccolith morphology equally or more strongly in overcalcified strains compared to moderately calcified strains."
As this sentence refers to results from laboratory experiments testing the response to changes in seawater chemistry it should read:
"Low seawater pH conditions affected coccolith morphology equally or more strongly in overcalcified strains compared to moderately calcified strains."

This differentiation might seem pedantic but in my opinion important and the term "ocean acidification" should be solely used for the current globally ongoing anthropogenic process. I understand that the final decision is with the author as it relies on personal preferences and writing style. However, I wanted to raise this point and hope that the authors and readers of this discussion forum will take this point in consideration.

2. At several points in the manuscript (p. 2, line 24 and p. 10, line 2) the authors raises the question on the function/ecological purpose of coccolithophore calcification. This is an important topic and several hypotheses have been put forward.
I agree with the authors that a protective function of coccoliths is not deniable and logic because presumably all organic or inorganic structures located outside the cell membrane will act in some way protective against physicochemical environmental conditions or predation. However, I would like to raise the point that it will be important to differentiate between a possible function/purpose in the modern ocean and the evolutionary trigger of calcification in coccolithophores. The answers to these two questions might be quite different but certainly will help to advance our understanding of coccolithophore calcification. I have addressed this issue previously and invite the interested authors to refer to Muller et al. 2015a.

Müller et al. (2015) Phytoplankton calcification as an effective mechanism to alleviate cellular calcium poisoning, Biogeosciences, 12, 6493-6501.

3. The authors might want to consider moving Fig. 7 to the supplemental material or to the material and method section because it doesn't contribute to the core results and discussion.

4. On a stylistic note I recommend to avoid the start of a sentence with the abbreviation for ocean acidification (e.g. abstract line 28 and 29).

5. Section 2.2.: Please revise the introduction of the abbreviations for dissolved inorganic carbon, total carbon and total alkalinity. The abbreviation should be consistent and introduced on the first appearance.

6. Page 3, line 34: While the accuracy is given for the total alkalinity analysis, it would be helpful if the other could also provide the precision.

7. Page 3, line 35: correct “Bath” to “Batch”.

8. Page 6, line 5: see point 5

9. Page 10, line 14-17: The overcalcified strains tested in mentioned study also experienced a reduction of growth rate under elevated pCO2 compared to ambient conditions. The reduction of 5-6% was small but tested significant. Please correct.

10. Page 10, line 32: The words “study” and “strain” are not interchangeable here.

11. Page 10, line 35: Please correct “OA pH”.

12. Page 11, line 30 and 36: See point 1.