Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2017-399-AC2, 2018

Biogeosciences Discussions

Interactive comment on "Latitudinal trends in stable isotope signatures and carbon concentrating mechanisms of northeast Atlantic rhodoliths" *by* Laurie C. Hofmann and Svenja Heesch

Laurie C. Hofmann and Svenja Heesch

lhofmann@mpi-bremen.de

Received and published: 18 June 2018

The authors would like to express their gratitude to the second reviewer for their thoughtful and constructive comments. Our response to his/her comments are below.

General comments:

1. We have added a figure (Figure 2 - see attached) to show the direct relationship between d13C signatures and latitude for our samples. We also added a map showing our sites and the corresponding mean d13C signatures, based on suggestions from

the first reviewer (Fig. 6 - see attached).

2. We have added a description of the methods for d13C and d15N analysis used by the UC Davis stable isotope facility.

"The samples were analyzed for 13C and 15N isotopes using a PDZ Europa ANCA-GSL elemental analyzer interfaced to a PDZ Europa 20-20 isotope ratio mass spectrometer (Sercon Ltd., Cheshire, UK). Samples were combusted at 1000°C in a reactor packed with chromium oxide and silvered copper oxide. Following combustion, oxides were removed in a reduction reactor (reduced copper at 650°C). N2 and CO2 were separated on a Carbosieve GC column (65°C, 65 mL/min) before entering the IRMS. During analysis, samples were interspersed with several replicates of different laboratory standards (glutamic acid and peach leaves), which were previously calibrated against NIST Standard Reference Materials.

3. Based on similar comments from the first reviewer, our light exposure experiment has been removed from the manuscript and we have improved the description of the methods (see comments to first reviewer) and presentation of data from our pH drift experiments (Fig 9 - see attached). We have removed the section on the carbon use model, considering that, as the first reviewer mentioned, the pH change was much lower than would be expected, and it is possible that a 24 hour was not long enough to reach the pH compensation point. We will address this by stating "pH drift experiments showed that the seawater pH actually decreased after a 24 hour light incubation for both Phymatolithon calcareum and P. purpureum. However, these samples were small, and it is possible that the incubation period was not long enough to detect a significant change in pH."

Minors:

1. CCMs are now defined at the beginning of the abstract

2. We have edited the symbols so that ∂ is used throughout

3. The numbers behind the parenthesis represent lat/long coordinates

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2017-399, 2017.

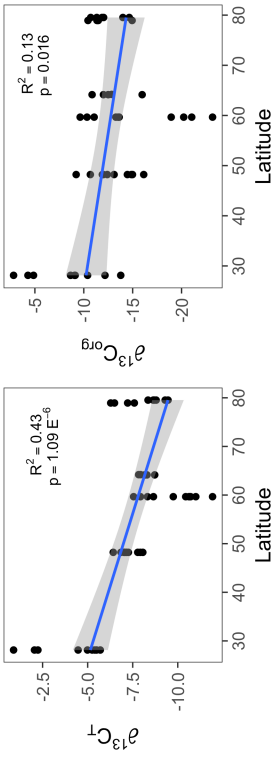

Fig. 1. Figure 2. The organic (∂13Corg) and total (∂13CT) stable carbon isotope signatures of all Lithothamnion spp. collected for this study as a function of latitude, excluding the Mossel-bukta samples colle

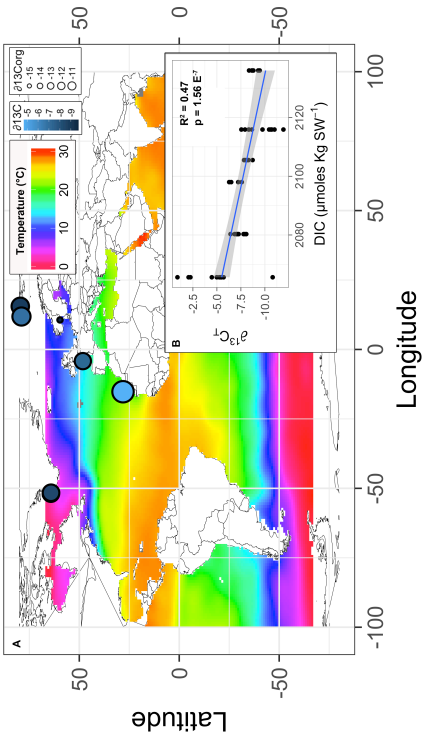

Fig. 2. Figure 6. A) The mean skeletal (∂13C = symbol color) and organic (∂13Corg = symbol size) stable carbon isotope signatures of Lithothamnion spp. mapped in relationship to surface ocean temperature, exc

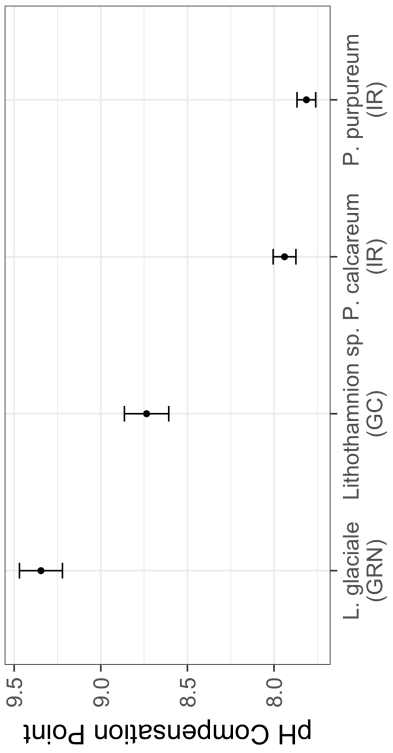

Fig. 3. Figure 9. The pH compensation points (maximum pH reached during pH drift experiment) for the rhodoliths from Greenland (GRN), Gran Canaria (GC) and Ireland (IR).