

## ***Interactive comment on “Validation of carbon isotope fractionation in algal lipids as a $PCO_2$ proxy using a natural $CO_2$ seep (Shikine Island, Japan)” by Caitlyn R. Witkowski et al.***

### **Anonymous Referee #2**

Received and published: 6 July 2019

Witkowski et al. report carbon isotope fractionation from  $CO_2$  into algal lipids found in various sample substrates in the vicinity of natural  $CO_2$  seeps. They successfully use these sites to ground-truth the use of algal lipid carbon isotope fractionation as a  $pCO_2$  proxy. I congratulate the authors on this novel, comprehensive, and concise study. I have some minor comments that should be addressed before acceptance. Further, I would like to ask the authors to use continuous line numbers in the future, as is standard practice.

Line comments: Page 4, 1: Why were the filters combusted only at 300 C for 3h? Standard practice is 450 C for 5h or similar.

Printer-friendly version

Discussion paper



Page 5, 6-8: Unclear if the reported pCO<sub>2</sub> values (is this dissolved CO<sub>2</sub>?) are taken from the literature or are original data. If these are original data, the authors need to state in detail how pCO<sub>2</sub>(aq) was calculated. If these are literature values, and not measured from the same samples as the d<sup>13</sup>C-DIC values, the authors need to state why they consider these values to be adequate for comparison with their samples (both in a spatial and temporal sense).

Page 5-6: The authors should include all data as either a main text table or supplementary table/data file, containing d<sup>13</sup>C-DIC, d<sup>13</sup>C-CO<sub>2</sub>, d<sup>13</sup>C of biomarkers etc.

Page 8, 11-12: Is it reasonable to assume a constant temperature? Is there no seasonality in primary productivity at this site?

Page 8, 25-Page 9, 21: Here you could discuss the recent paper by Badger et al. (Climate of the Past, doi: 10.5194/cp-15-539-2019) suggesting insensitivity of alkenone-<sup>13</sup>C at low-mid pCO<sub>2</sub> levels.

Page 9, 18: “annually”

Page 9, 28: I would suggest being more cautious with the wording (“likely”) here. Can you provide evidence to support your argument for allochthonous input? Where would this come from?

---

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-158>, 2019.

Printer-friendly version

Discussion paper

