

## ***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.***

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I commend Caitlyn Witkowski and the NIOZ group for another impressive paper on paleo- $PCO_2$  reconstruction (“Validation of carbon isotope fractionation in algal lipids as a  $PCO_2$  proxy using a natural  $CO_2$  seep (Shikine Island, Japan)”).

In the last couple of years, some colleagues and collaborators (including Alan Mix) have pointed out to me that the original works of Jasper and Hayes (1990) and subsequently additionally Prahl and Mix (1994) were being overlooked by succeeding researchers in the paleo- $PCO_2$  area. I thank Caitlyn and her colleagues for referencing and integrating our work in this present, important work.

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There are a few items that do not seem to translate well into the contemporary paleo-PCO<sub>2</sub> literature:

À To my best understanding, Jasper and Hayes (Nature, 1990) was the first to perform specific-molecular paleo-PCO<sub>2</sub> reconstruction, in particular, via the insight that sedimentary alkenone d<sup>13</sup>C record (DSDP 619 from the Gulf of Mexico) could be preliminarily calibrated against an ice core record of pCO<sub>2</sub> (the Antarctic Vostok ice core). That was an important advance, connecting the ideas of sedimentary eP to an observed ice-core pCO<sub>2</sub> record, opening the opportunity for paleo-PCO<sub>2</sub> reconstruction far into the ancient past; and, À This concept was neatly summarized in Figure 3 of Jasper et al. (Paleoceanography, 1994) which has been the template for much succeeding research in this area.

John Hayes and I fully appreciated that the paleo-PCO<sub>2</sub> barometer would require further analysis and calibration in contemporary natural and laboratory systems. We were very glad to initially participate in this work (Bidigare, ..Jasper, Hayes et al., Glob. Biogeochem. Cyc., 1997) with many other excellent researchers.

Congratulations on NIOZ's group's excellent work on the very important of PCO<sub>2</sub> reconstruction and understanding climate change. As I variously try to impress upon people, global temperature is an exceedingly important climatic variable and pCO<sub>2</sub> drives temperature. I hope that the work of Witkowski and colleagues will have influence in the current climate discussion.

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