

Interactive comment on “Carbon dynamics in the western Arctic Ocean: insights from full-depth carbon isotope profiles of DIC, DOC, and POC” by D. R. Griffith et al.

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Received and published: 9 January 2012

The authors present novel and interesting data on the isotopic compositions of the major forms of carbon in the Canada Basin. There are many potential uses for these data, and the authors highlight one particularly interesting observation - the potential for an isotopic signature of chemolithoautotrophic carbon fixation at intermediate depths in the basin. Indications of chemolithoautotrophy have been observed at intermediate depths in other ocean basins, so the authors' observations are consistent with the growing recognition of this process of carbon fixation in the ocean interior.

The low $\delta^{14}\text{C}$ values in the deep Canada Basin are an interesting feature that the

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authors do not discuss. The $\delta^{14}\text{C}$ in the deep Canada Basin is depleted (-45‰) in comparison to values for the deep North Atlantic (-39‰ Bauer 2002). It appears this could be due to aging in the Canada Basin, which is consistent with the increase in age of DIC in basin deep waters. However, the $\delta^{13}\text{C}$ in the deep Canada Basin is also depleted (-23‰ in comparison to the deep North Atlantic (-21‰ Bauer 2002). This suggests a different source of DOC could also be impacting its $\delta^{14}\text{C}$ content. It would be useful for the authors to expand on this and make a more quantitative comparison between the depletion of radiocarbon in DOC and DIC in the Canada Basin.

Specific comment: Pg 10687, line 9 - the rate of carbon fixation should include the unit of time ($3\text{--}16 \mu\text{mol C m}^{-3} \text{y}^{-1}$)

Interactive comment on Biogeosciences Discuss., 8, 10677, 2011.

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