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Interactive comment on "Prominent bacterial heterotrophy and sources of ^{13}C-depleted fatty acids to the interior Canada Basin" *by* S. R. Shah et al.

Anonymous Referee #1

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This paper reports the concentration and stable carbon isotopic composition of fatty acids extracted from suspended particulate organic matter from Canada Basin. They found variable d13C in fatty acids along the water depth and discuss the controlling factor of them. Such information is required for investigating the fate of organic matter in the very cold water column, and important when interpreting the sedimentary fatty acid record. The data are original, the data quality is good, and the manuscript is well written. Therefore, I think the manuscript can be accepted after corrections described below.

1) In introduction section, please describe about the source organisms and distribution of fatty acids in biotic realm. Furthermore, please describe the advantage (and

disadvantage) of fatty acids as recorders of oceanic processes.

2) Locality map is needed.

3) How the seasonality of the Arctic Ocean affect the water column profile of d13C of fatty acids?

4) Suspended POC has a long residence time relative to sinking organic carbon in the water column. I guess a significant portion of suspended POM should have been formed a year ago or older. How this affects the profile. Do the authors measure 14C of these samples?

5) The authors suggeted that C26-C32 fatty acids were degraded (p. 19), while these components have been found in many oceanic sediments. Isn't there a possibility that they are not produced in the terrestrial environment close to the study site?

p. 14 line 25: "can been seen. . ." should be "can be seen. . ."

Interactive comment on Biogeosciences Discuss., 10, 6695, 2013.