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## ***Interactive comment on “Mechanisms of microbial carbon sequestration in the ocean – future research directions” by N. Jiao et al.***

**Anonymous Referee #2**

Received and published: 11 June 2014

This synthesis paper by Jiao et al. presents a comprehensive overview of the role of the microbial carbon pump in sequestering carbon, and how to explore potential future changes to these processes due to anthropogenic effects on the global ocean and climate. The paper provides a useful detailed summary of the current field and future research directions. The text is organized well and is easy-to-read, and so the only comment I have on the structure of the manuscript is section 6.3. The paragraph here detailing mesocosm experiments reads like a laundry list of results and should either be summarized more efficiently or the specific results moved to the appropriate place in section 5 (e.g. under OA or nutrient supply). With regards to the figures, figure 3 is not terribly useful in that the gradients radiating out from a single point compared to three separate linear gradients does not seem relevant (or at least is not addressed in the text). In figure 4, the left panel needs to be further described in the caption to

C2361

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include the arrow shown in the top graph as well as the color change from black to red for the lines.

There are several minor edits to the text as written that I would recommend:

- pg 3, line 28 - change **numerical** to **numerous**
- pg 4, line 23 - insert **of** (“... identify the challenges **of** and devise strategies for ...”)
- pg 6, line 10 - FT-ICR-MS is already defined earlier in the paragraph
- pg 8, line 9 - hyphenate concentration and constrained (“concentration-constrained”)
- pg 9, line 11 - insert **an** (“... favored **an** intensive anaerobic MCP ...”)
- pg 10, line 14 - insert comma (“... to a reservoir, e.g. the ocean, ...”)
- pg 11, line 2 - use consistent form for units (PgC year-1 and PgC/yr both used in same sentence)
- pg 11, line 3 - hyphenate RDOC-based and POC-based
- pg 12, line 1 - hyphenate “RDOC-coated”
- pg 13, line 11 - remove **on** (“... will in turn impact the export of POC”)
- pg 15, line 18 - insert **be** (“... and thus **be** of poor food quality...”)
- pg 18, line 12 - hyphenate climate-derived
- pg 18, line 24 - hyphenate DOC-derived
- pg 15, line 15 - reference Ingalls et al., 2006 in PNAS
- pg 22, line 22 - should define SLDOC in the text either here or back on pg 5
- pg 23, lines 10-15 - excessive use of “such” in these sentences, reword if possible
- pg 26, line 6 - hyphenate RDOC-coated

Interactive comment on Biogeosciences Discuss., 11, 7931, 2014.

**BGD**

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