

## ***Interactive comment on “First in situ estimations of small phytoplankton carbon and nitrogen uptake rates in the Kara, Laptev, and East Siberian seas” by Bhavya P. Sadanandan et al.***

### **Anonymous Referee #2**

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The manuscript “Small phytoplankton contribution to the carbon and nitrogen uptake rates in the Laptev, Kara, and East Siberian Seas” written by Bhavya et al describes carbon and nitrogen uptake rates of small phytoplankton in the Laptev, Kara, and East Siberian Seas, Arctic Ocean, in which field-measured observation data are very scarce. This paper is very interesting to present small phytoplankton contribution to the total carbon and nitrogen uptake rates and especially some potential possibility of small phytoplankton thrive under sea ice retreat in the Arctic Ocean. The present study has scientific merits and originality in that: 1. the topic, “Small phytoplankton contribution to the carbon and nitrogen uptake rates in the Laptev, Kara, and East Siberian Seas”, is very intriguing enough to draw much attention for understanding Arctic ma-

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rine ecosystem especially in the Laptev, Kara, and East Siberian Seas under ongoing environmental changes ; 2. the study is one of few studies for the contribution of small phytoplankton in the Arctic Ocean; 3. The result from the present study shows some possibility of small phytoplankton thrive under sea ice retreat.

However, the current manuscript should be more polished for the final version. For example, some missing references and incorrect ones, e.g., Hill and Cota, 2005, Arrigo et al., 2015, McLaughlin and Carmack, 2010, and more. Authors need to check the references throughout the text. Some contents in the manuscript are confused for small phytoplankton or total phytoplankton as mentioned below,

Overall, I recommend publication of this manuscript for Biogeosciences after some minor revisions. I hope to see authors undertake revisions in an appropriate manner because I really want to see the final version of this paper in print. Some minor comments are listed below: -Line 97, The major rivers flows in to the Arctic.. Change with..flow into the Arctic.. -Line 109, ..a first.. Change with the first.. -No detail description for the measurements for water temperature and salinity in materials and methods. - Line 132, The chlorophyll (chl) samples... chlorophyll a? or chlorophyll a, b, and c? -Line 140, C and N uptake rates.. C and DIN uptake rates? -Line 151, light filters.. What kind of light filters? -Line 165, the methods Slawyk et al., 1977.. Check the sentence! -Line 191, a subsurface maxima like most of global ocean.. You need add some related references for that! -Line 194, The depth integrated.. Make a consistency with depth-integrated inline 192 -Line 197, the maximum small plankton... small phytoplankton? -Line 197-198, How about any explanation for the maximum uptake rates at AF09? - Line 219-220, any related reference? -Line 227-228, higher C and DIN uptake rates of what? Small phytoplankton or total phytoplankton? -Line 231, lower C and DIN uptake rates of what? Small phytoplankton or total phytoplankton? ⇒ very confused!! -Line 236, metabolic activities of phytoplankton. Small phytoplankton? -Line 237, Not much discussion for small phytoplankton primary production in 3.4 section!! You need to focus more on small phytoplankton primary production. -Line 253-254, make a same

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digit for concentrations. -Line 258, check the sentence! -Line 263, this the stations.. which stations you mean? -Line 271, lower C and DIN uptake rates of What? Small or total phytoplankton? -Line 279-282, Is this for only small phytoplankton contribution? You need to discuss more on small phytoplankton primary production. -Line 308, plankton to facilitate.. phytoplankton or zooplankton? -Line 327-329, Are the results for turnover time in India for small phytoplankton? Or total phytoplankton? If these results for total phytoplankton, then is it appropriate to compare turnover rates for small phytoplankton in this study? -Line 339, ..quantum efficiency/yield.. What “/” means? -Line 343, it should be like this, ..C and N were observed.. -Line 345-346, N yield.. Is this term correct? -Line 350-351, check the sentence! -Line 373, Should be “the total primary production (Hodal and Kristiansen, 2008).” -Line 376, .large phytoplankton cells (45 $\mu$ m). Is this size correct? Check the cell size!

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