

Interactive comment on “Small phytoplankton contribution to the total primary production in the Amundsen Sea” by Sang H. Lee et al.

Anonymous Referee #1

Received and published: 17 November 2016

The manuscripts “Small phytoplankton contribution to the total primary production in the Amundsen Sea” by Lee et al. presents observational data in Amundson during 1-14 January 2014 cruise and discussed an important issue on the small phytoplankton contribution to the total primary production. I found the data and discussion deserved for publication in BG with minor revision. I suggest the authors to improve description of the differences between non-polynya and polynya regions, maybe a regroup those stations in order to make the conclusions stronger. It is also important to include time period of measurements when discuss comparison with other studies in many places in the manuscript. Here are some details: L223-225: “our total 223 daily carbon uptake rate in 224 polynya region ($0.84 \text{ g C m}^{-2} \text{ d}^{-1}$) is within the range between Lee et al. (2012; $2.2 \text{ g C m}^{-2} \text{ d}^{-1}$) and Kim et al. (2015; $0.2 \text{ g C m}^{-2} \text{ d}^{-1}$).” The wide range of carbon uptake rates are mainly due to the different measurement timing (or location).

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This is an example where it is necessary to add which month (not just year) the data were measured when comparing those numbers.

L274 states “small phytoplankton were higher in non-polynya region (Table 1)”. L281 states ‘diatoms are relatively dominant in the non-polynya regions (Lee et al., 2012)’. Please explain why they are different as we normally think diatom is large phytoplankton.

In Fig 2-4, small phytoplankton were lower in non-polynya stations 3 and 3-1, higher in 1 and 2. Stations 1 and 2 had very low production and its ratio may not represent the ratio when bloom occurs in those locations. It is necessary to note whether the ratios in Table 1 is the average of ratios in each station or calculated from the average of chl-a, PP.

L315: ‘anticipating small-dominant ecosystem under warming oceans’. We have found increasing small phytoplankton due to warming Arctic, but in Amundson, small phytoplankton contribution was found to be higher under ice (cold) rather than in polynya (warm) in this study. It looks like we are heading to large-dominant ecosystem under warming ocean in Amundson.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-453, 2016.

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