Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2020-305-RC1, 2020

Geoscientific Model Development Discussions
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Interactive comment on "Ice Algae Model Intercomparison Project phase 2 (IAMIP2)" *by* Hakase Hayashida et al.

Anonymous Referee #1

Received and published: 18 December 2020

General comment: The manuscript "Ice Algae Model Intercomparison Project phase 2 (IAMIP2)" presents the experimental protocol of a new model intercomparison project with focus on sea ice algae and biogeochemistry. This model intercomparison builds upon a previous one (IAMIP1) which investigated variability in sea ice algae production on a season to decadal scale in the Arctic. New compared to the IAMIP1, IAMIP2 focuses on centennial scales and includes also the Antarctic region. In the present manuscript, the authors describe the coupled sea-iceâĂŤoceanâĂŤbiogeochemical models that are, so far, taking part in the IAMIP2, they present the chosen atmospheric forcing dataset, and discuss the limitation of the IAMIP2 set up.

In the light of the fast changes experienced by polar regions as consequence of climate changes, and of the rapid decline of sea-ice cover, especially in the Arctic, it is of

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extreme importance to understand the role that ice-produced carbon has for the polar marine ecosystems. Considering the limitations and constrains in sampling sea ice, the scientific community strongly relies on numerical experiments to quantify the important of sea ice algae and their role for the ecosystem on a large scale. This model intercomparison project, thus, is relevant for the community. The manuscript is well structured and the presentation of good quality. Figures and Table are appropriate. I recommend it for publication after the following minor edits are addressed by the authors.

Detailed comments: L30: add “together with phytoplankton”

L39: here the authors should acknowledge recent advancements in sampling the sea-ice biophysical properties on larger scales, the only reference to Miller et al., (2015) is not enough. See e.g., Lange et al., (2017); Castellani et al., (2020); Cimoli et al., (2020). Despite these recent advancements in characterizing sea ice algae spatial variability, we still rely on numerical models to obtain pan-Arctic and global estimates, thus stressing the relevance of such model intercomparison.

L271: add space between “40” and “°C”

L315: add “especially in the Antarctic” before the full stop

[references] Lange B.A., Katlein C., Castellani G., Fernández-Méndez M., Nicolaus M., Peeken I. and Flores H. (2017) Characterizing Spatial Variability of Ice Algal Chlorophyll a and Net Primary Production between Sea Ice Habitats Using Horizontal Profiling Platforms. Front. Mar. Sci. 4:349. doi: 10.3389/fmars.2017.00349

Castellani G., Schaafsma F.L., Arndt S., Lange B.A., Peeken I., Ehrlich J., David C., Ricker R., Krumpen T., Hendricks S., Schwegmann S., Massicotte P. and Flores H. (2020) Large-Scale Variability of Physical and Biological Sea-Ice Properties in Polar Oceans. Front. Mar. Sci. 7:536. doi: 10.3389/fmars.2020.00536

Cimoli, E., Lucieer, V., Meiners, K.M. et al. Mapping the in situ microspatial distribution of ice algal biomass through hyperspectral imaging of sea-ice cores. Sci Rep 10, 21848

(2020). https://doi.org/10.1038/s41598-020-79084-6

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