

Interactive comment on “Seasonal sea ice forecast skills and predictability of the KMA’s GloSea5” by Byoung Woong An et al.

Anonymous Referee #1

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The paper tc-2018-217 by Byoung Woong An et al. addresses the scientific question of seasonal sea-ice forecast skill, which is relevant and within the scope of TC. Used scientific methods and assumptions seem valid and sound, and the GloSea5 system technical description in section 2.1 is rather clear. In general, the results seem sufficient to support the interpretations and conclusions presented.

However, concepts, ideas, tools and data do not appear novel. For example, it is not clear how the GloSea5 system operated by KMA differs from the developed at the UK Met Office. This shortcoming makes the description of experiments and calculations insufficiently complete and precise, and therefore do not allow their reproduction by fellow scientists. Also, if the KMA version is close to the UK Met Office one, seems strange that the UK Met Office seasonal sea-ice forecasters are not involved in this

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study, and that their work is not credited and cited. In general, it seems likely that some key literature are missing in the paper as I point out next.

Importantly, the results presented in the abstract and conclusions do not appear substantial. The authors state that the sea-ice prediction was improved by implementing sea-ice thickness initial conditions and that sea-ice thickness is a key parameter for skillful prediction. But this has already been shown in many earlier studies, for example by Day et al. (2014). The specific results related to the GloSea5 system have also already been shown by Peterson et al. (2014), who are strangely is not cited in this paper, using the GloSea4 system, the predecessor of GloSea5. For example, the authors find that GloSea5 provides skillful Arctic seasonal sea-ice extent predictions up to six months and that the GloSea5 sea-ice concentration forecast skill better from October to March than from January to June. These results can also be found in Peterson et al. (2014). Moreover, the authors find that GloSea5 has a good sea-ice concentration predictability, except in summer. This finding seem to match the one by Peterson et al. (2014), who found that the GloSea4 sea-ice prediction skill for September decreases after early April due to thinning of sea ice at the start of the melt season. In summary, it is difficult to find original and important results in this paper.

Although the overall presentation follows well the general structure of a scientific paper as divided to sections, the text at the paragraph level is often very hard to read and sentence-to-sentence logic often impossible to follow, for example in Introduction. These problems arise partly because the language is not fluent and precise. Therefore the text should be inspected, rewritten and clarified. The paper is also too long (over 12 pages) for a research article in the Cryosphere and should be shortened.

Because of these shortcomings I suggest that the manuscript is rejected and recommend that the authors could submit a rewritten manuscript for review later, if substantial results are found.

References:

Day, J. J., Hawkins, E., & Tietsche, S. (2014). Will Arctic sea ice thickness initialization improve seasonal forecast skill? *Geophysical Research Letters*, <https://doi.org/10.1002/2014GL061694>

Peterson, K. A., Arribas, A., Hewitt, H. T., Keen, A. B., Lea, D. J., & McLaren, A. J. (2014). Assessing the forecast skill of Arctic sea ice extent in the GloSea4 seasonal prediction system. *Climate Dynamics*, 44(1–2), 147–162. <https://doi.org/10.1007/s00382-014-2190-9>

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