Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC3
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Comment on gmd-2021-99

Anonymous Referee #3

Referee comment on "SITool (v1.0) – a new evaluation tool for large-scale sea ice simulations: application to CMIP6 OMIP" by Xia Lin et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-99-RC3, 2021

Review of "SITool (v1.0) - a new evaluation tool for large-scale sea ice simulations: application to CMIP6 OMIP" by Xia Lin, François Massonnet, Thierry Fichefet, Martin Vancoppenolle (gmd-2021-99).

[General comments]

This paper introduces an evaluation tool for sea ice simulation and presents its application to CMIP6-OMIP simulations available through ESGF. I think that such a tool will become a valuable asset for the climate/sea ice modeling community and such activities should be strongly encouraged. Calculation methods of metrics are well described and the evaluation using this tool is well presented. The comparison between OMIP-1 and OMIP-2 simulations, which use different surface atmospheric forcing dataset, is timely and should be highly appreciated. However, I think that some discussion would be needed for the proposed method for the evaluation of interannual variability and trend as commented below.

[Specific comments]

Metrics are proposed for the monthly mean state, interannual variability, and trend, with each metric basically using common calculation method: difference between simulation and observational reference is scaled by observational uncertainty based on the difference between two observational datasets. For me, applying this method to the monthly mean state was understandable, but it was somewhat difficult to interpret the specific values of metrics for interannual variability (standard deviation of monthly anomalies) and trend. If I was to evaluate interannual variability of a simulation, I would like to know the size of the standard deviation of monthly anomalies relative to that of observational reference. Specifically, I think that the metrics would be easier to interpret if the standard deviation was scaled by the that of an observational reference and the range of values obtained by

applying different observational references were presented. The same argument would be applied to trends and in this case the signs of trends could be also evaluated. I would like to ask the authors to explain the background behind the choice of the current method.

I would like to add that it would be useful and clear if the calculation methods are presented using mathematical formulas.

[Technical corrections]

L135, 150, 164: Why equal weight is used for these metrics?

L184: “the influence model resolution” should read “the influence of model resolution”.

L286: “exits” should read “exists”.

L288: “without reduction”… I could not understand the meaning of this phrase in the sentence.

Figure 3: It was difficult for me to distinguish the lines. I would suggest the figures to be separated for OMIP-1, OMIP2, and their means, that is, into the total of six figures.