

## ***Interactive comment on “Evaluation of the atmosphere-land-ocean-sea ice interface processes in the Regional Arctic System Model Version 1 (RASM1) using local and globally gridded observations” by Michael A. Brunke et al.***

**Anonymous Referee #2**

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Review of Brunke et al. submitted to Geoscientific Model Development

General: This manuscript is revised from a manuscript previously submitted to a journal. It's much improved from the earlier version. It's now close to being ready for publication. Reviewers are often critical of model evaluations for multi-component models, since it's difficult to do a comprehensive evaluation in a standard-size manuscript. Such papers can be piecemeal and incomplete. However, there a series of papers on RASM with more detailed evaluations of the model components, so general paper on RASM performance is appropriate here. The figures and figures-linkage to manuscript could

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use a more careful editing.

Specific Comments.

(1) latter part of page 2. When RASM first appeared it the resolution advantage over global models was especially an advantage. Global models are now encroaching on mesoscale resolutions in some cases. Also, variable resolution global models (<http://www.tropmet.res.in/introspect/presentation/16feb/skamarock.pdf>) are becoming or will become rivals to regional climate models. This is a concern to be kept in mind for RASM.

(2) second paragraph of page 3. This section fulfills an important need to define how the success of RASM results is to be measured.

(3) page 4, line 11. "ramped upwards from zero" is confusing.

(4) page 9, line 12. Should be a reference to Figure 2.

(5) page 9, line 20. "regional river basins" seems to come out of nowhere.

(6) page 9, line 23. "The biases relative to GPCP are generally the opposite ..." Are you discussing Figure 3?

(7) The figure captions for Figures 4 and 5 are not consistent.

(8) page 11, line 3. I realize you wish to minimize the discussion of cloud microphysics in this paper. However, it would be a good idea to at least mention the microphysics scheme here. In the second paragraph on this page, it could be mentioned that in general it is difficult to represent Arctic clouds in numerical models (e.g., Vavrus 2004; J. Climate, 17(3), 603-615).

(9) page 13, line 1. typo "is" to "are"

(10) page 13, line 11 "near-zero observations" ?

(11) page 15, third paragraph. The correct value of conductive heat fluxes through

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the pack ice for SHEBA and presumably the Arctic Ocean as a whole is difficult to know, and appears to vary considerably over small distances (Sturm et al. 2001; 33(1), 213-220).

(12) Figure 14. I don't see a purple line.

(13) page 16, line 11. Appears to be a reference to Figure 15.

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