

Interactive comment on “Arctic Ocean sea ice snow depth evaluation and bias sensitivity in CCSM” by B. A. Blazey et al.

Anonymous Referee #3

Received and published: 4 June 2013

This paper evaluates the representation of snow over Arctic sea ice as simulated by the CCSM. An observational dataset of polar drift stations from Russia are assembled to verify the accuracy of the CCSM snow depth simulations over sea ice. It is shown that the CCSM exhibits a positive bias in the amount of snow simulated over sea ice, in part because of processes such as blowing snow, densification, and changes in snow conductivity that not represented in the model. The paper is well written and provides an important contribution on modeling the snow/sea ice system for the Arctic Ocean. I recommend the paper undergoes minor revisions prior to publication.

General comments:

1) How does the albedo of snow over sea ice evolve over time and how does it differ from the albedo for sea ice in the CCSM?

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2) Have the authors considered examining the long term trends in snow over sea ice and how this may be related to changes in snowfall in the Arctic?

Specific comments:

1) P. 1498, lines 20 and 24: Please define “CCSM” and “CICE”.

2) P. 1500, line 16: Note that blowing snow transport into leads can also result in a loss of mass atop the sea ice (Déry and Tremblay 2004).

3) P. 1500, line 22: Please insert “horizontal” before “resolution”.

4) P. 1501, line 10: Define “SOM”.

5) P. 1506, line 18: Insert “the” before “vicinity”.

6) P. 1507, line 8: Note the spelling error in “sublimation”.

7) P. 1508, line 13: Do you mean “alterations” here?

8) P. 1512, line 4: Should this be “1.1 W m⁻²”?

9) P. 1516, line 10: Replace “effected” with “affected”.

New References:

Déry, S. J., and Tremblay, L.-B. 2004: Modeling the effects of wind redistribution on the snow mass budget of polar sea ice, *J. Phys. Ocean.*, 34(1), 258-271.

Interactive comment on The Cryosphere Discuss., 7, 1495, 2013.