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Interactive comment on "Arctic sea ice melt onset from passive microwave satellite data: 1979–2012" *by* A. C. Bliss and M. R. Anderson

Anonymous Referee #2

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Arctic sea ice melt onset from passive microwave satellite data: 1979–2012 by Bliss and Anderson

General Comments: The manuscript is well-written and nicely presented but is very light on new information. The melt onset algorithm by Drobot and Anderson (2001) has been updated and the trends have been re-calculated but I'm not sure if that is sufficiently new information to warrant publication. My major concern is that Stroeve et al. (2014)-GRL just recently provided a new and thorough assessment of the links between melt, freeze and changing Arctic sea ice that includes trends and driving factors. Markus et al. (2009)-JGR also just fairly recently published a paper on melt and freeze trends. I think the authors need to add some new information to this work other than just updating the trends. I offer a few suggestions that hopefully could improve

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this contribution.

1. What about investigating the factors influencing melt onset? Drobot and Anderson (2001) looked at the relationship to the Arctic Oscillation. Does this relationship still hold? What about looking at some synoptic weather events driving melt? Else et al. (2014)-JGR (DOI: 10.1002/2013JC009672) provided a detailed look at the transition to melt onset over landfast sea ice which could be scaled up using NCEP or APP-x data.

2. Have the authors thought about comparing melt onset dates to climate model output? The operational ice forecasting community is very interested in knowing how well their models represent the timing of melt (and freeze). Wang et al. (2011)-JGR compared satellite derived melt onset to the Canadian Coupled Global Climate Model and noted model biases so perhaps other models could be looked at? Mortin et al. 2013-Climate Dynamics (DOI: 10.1007/s00382-013-1811-z) provide a very thorough approach of which some aspects could be used in your analysis.

3. What about adding a section to the manuscript comparing the AHRA approach with other melt algorithms? I realize the Markus et al. (2009)-JGR approach utilizes the AHRA as an indicator but I'm not sure about if there has been a comparison between the two approaches. There are also melt onset dates available by QuikSCAT and ASCAT that could also be used for comparison. See Mortin et al. 2014-RSE (http://dx.doi.org/10.1016/j.rse.2013.11.004) and Mortin et al. 2012-JGR (doi:10.1029/2012JC008001).

Specific Comments: Title Suggest changing it to "Melt onset over Arctic sea ice..." or "Snowmelt onset over Arctic sea ice..." because that is what the Tb's are actually detecting.

Page 3040, Line 14 You could probably add a reference or two for the increases in liquid water that increases Tbs. I also think the authors should move the Drobot and Anderson (2001) reference to the start of the paragraph.

TCD
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Page 3041 Line 11 I assume the author's mean NASATeam ice concentration estimates?

Page 3041, Line 10 Based on the 50%> ice concentration threshold, when trends for the marginal ice zones are calculated they will not always be for the same number of years. I think this needs to be shown visually because it influences the rates of change and perhaps your statistical significance because of reduced degrees of freedom. An iso-melt line showing spatially where the concentration is always greater than 50% would be useful and show where you have confidence in the trends.

Page 3041, Section 2.2 I think there is value to be added from a more detailed comparison between V2 and V3. The authors discuss the improvements made with V3 but could they be quantified?

Page 3046 Perhaps it would be useful to look at the Bering Sea more closely? This could add another component to the manuscript (see General Comments). The authors could look at the ice concentration anomalies with respect to melt onset timing. Plotting air temperatures for the region might also lend some insight. A section on explaining regional melt onset variability could also be a useful addition.

Interactive comment on The Cryosphere Discuss., 8, 3037, 2014.