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Interactive comment on “Longer spring snowmelt: spatial and temporal variations of snowmelt trends detected by passive microwave from 1988 to 2010 in the Yukon River Basin” by K. A. Semmens and J. M. Ramage

Anonymous Referee #3

Received and published: 22 May 2012

The authors have conducted an interesting study using satellite passive microwave data to examine snow melt in the Yukon basin. They identify melt onset, the end of the melt/refreeze interval and the duration between onset and interval end. They seek trends, frequencies and periodicities within sub basins. While a useful contribution to the literature there are weaknesses to the manuscript that warrant attention. These are discussed below.

A better introductory discussion of what is meant by melt-refreeze is needed. It must be made clear that this is not the end of melt. Rather it marks a point at which the

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snowpack no longer freezes (most likely at night). Just how far into the melt season does this occur? How does this vary by latitude and altitude within the basin? This could be examined by comparing the cessation date with runoff. Also, it should be further discussed whether a longer duration of the melt onset to end of melt/refreeze is a function of an earlier onset and/or a later end of melt/refreeze.

I have serious concerns regarding the power spectrum results. To state a possible relationship to an 11 year solar cycle with only 23 years of data is highly suspect. I would refrain from such a mention or at least couch it in the frame that I have suggested.

A question from a review familiar with microwave-snow studies but not a practitioner. Would using a multi-channel approach provide any additional evaluative assistance? Also might corrections with changes in instrumentation have an impact on the timing of the threshold exceedences? Couldn't this impact dates by a fair bit at times?

How are basins in Alaska most sensitive to winter increases in temperature (as suggested with the Nijssen et al reference on page 717, line 2)? Clearly, unless you are discussing potential increases in snowfall in this region associated with warmer temperatures there isn't a good reason for this. This is certainly the least important of the comments I've made.

Interactive comment on The Cryosphere Discuss., 6, 715, 2012.

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