

# ***Interactive comment on “An Extended Global Earth System Data Record on Daily Landscape Freeze-Thaw Status Determined from Satellite Passive Microwave Remote Sensing” by Youngwook Kim et al.***

**Anonymous Referee #2**

Received and published: 4 November 2016

The paper presents a new algorithm for freeze-thaw detection from passive microwave data. Thresholds are defined using an empirical linear regression relationship and combined with a cosine function for different weighting of values close to 0°C. Its a modified version of Kim et al. 2011. The results are compared to WMO station data, reanalyses data, river ice break-up records and another passive microwave (same dataset) based melt dataset from the Greenland ice sheet. It thus constitutes a classical research paper. It is not clear to me how the boundary between data and research paper is defined for ESSD, but I would see it more on the research side.

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What seems to be not within scope (as written on the ESSD web page) is comparison to other methods. By comparing it to the Greenland melt dataset, it is actually compared to another method of freeze/thaw detection on the same dataset. It is actually nowhere stated in the paper (and also not possible to guess from the reference Mote 2014) that it is based on the same records and an alternative method was applied.

Despite these concerns, the paper and dataset would be acceptable as a classical research paper (in a different journal) with following amendments/clarifications:

- 1) provide some graphics which illustrate the difference between the algorithm in this study and the one in Kim et al. 2011
- 2) explain why you use different thresholds for each year
- 3) provide details on data type and algorithm of Mote (2014), discuss the difference in algorithm along the identified differences
- 4) compare your results with those of Kim et al. 2011. Where/when does the new method provide better results?
- 5) line 333: there seem to be differences actually all winter, not only transition period
- 6) Table 2: spell out abbreviations in the table, its difficult to read otherwise

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Interactive comment on Earth Syst. Sci. Data Discuss., doi:10.5194/essd-2016-27, 2016.

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