The Cryosphere
Discussions

Interactive comment on "Melt ponds on Arctic sea ice determined from MODIS satellite data using an artificial neural network" by A. Rösel et al.

Anonymous Referee #3

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This paper addresses a significant problem in Arctic research: the spatial and temporal coverage of melt ponds. The authors analyze MODIS data to obtain a pan Arctic time series of melt pond fraction. The pond fractions are determined using sea ice spectral reflectances, an assumption of three surface types, and a neural network.

The paper is well done, presents interesting and important results and is worthy of publication with minor revisions. Below are some comments and suggestions for the author's consideration.

1. Introduction is an excellent summary of previous work and importance of problem.

2. Generally speaking, the paper is well written, but there are a few places where a small amount of grammatical editing is needed. For example, the Conclusions section

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has several awkward phrases. Such as: a. "areas from MODIS satellite data as shown exemplary on the melting cycle for the year 2008." b. "The zonal mean of the melt ponds is dependent on the temporal development of melt ponds from the geographical latitude."

3. Page 7: Please provide more explanation about neural networks. Many readers may not be familiar with neutral networks (I'm not familiar with them).

4. Information fraction of area that is cloud free would be valuable. How often can MODIS see the surface in summer? How large are the spatial and temporal gaps in the dataset.

5. Page 11: "In the autumn results we recognized that the spectral signal of thin ice areas looks similar to the spectral signal of melt ponds." This is not the case. While both ponds and thin ice have reduced albedos, the spectral signatures are different. Thin ice tends to be gray, flat across the spectrum, while ponds have a spectral peak (or hump) in the blue.

6. Page 11: "In this example, all AMSR-E algorithms are clearly underestimating the actual sea ice

7. "concentration by around 40%." This is a very interesting finding and needs to be explained in more detail. Why is the underestimation so great? Does MODIS Ap +Aw = Aw from AMSR-E?

Interactive comment on The Cryosphere Discuss., 5, 2991, 2011.