The Cryosphere Discussions

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

M. Tschudi (Referee)

mark.tschudi@colorado.edu

As the authors suggest, estimating melt pond coverage in the Arctic is critical for understanding the affect of pond evolution on ice albedo. This effort takes a significant look at this evolution over a large spatial area, so could be useful to the modeling community.

For the (2) equations, there are four equations, so four unknowns would well-pose the solution, rather than three. I have been using just two MODIS channels with three surface types (the bonus equation is that the fractions add to 1). I do like the idea of constraining the solutions with the sigmoid function - it may help to reduce the unrealistic solutions (where percentages are less than 0 or greater than 1).

In the results section, the pond fraction from trained ANN sets is compared to spectral

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unmixing. Is the latter just using (2)? If so, then the ANN method doesn't appear to affect the results much (less that 1%). If that's the case, then it's still worthwhile to investigate this, but I may be misinterpreting the "results calculated with the unmixing algorithm."

When using the MOD09 product, are clouds handled exclusively by the MOD09 pixel selection process (i.e. when the product is built by NASA)? If so, be aware that the cloud masks used don't capture all clouds - I have seen low-lying clouds interfering with obtaining a good surface reflectance, but not identified with the cloud-filtering used in MOD09. Probably nothing to do about that though, rather than to note it.

I like your assessment of the impact of ponds on pmw ice concentration retrieval.

As you've seen, pond fraction is not easy to estimate from medium-resolution satellite, but your work is taking a good step towards an Arctic-wide estimate, which is significant and useful.

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

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