**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 #2

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This paper makes a great first attempt at developing a multi-annual summer estimate and spatial climatology of Northern Hemisphere sea ice melt pond fraction throughout the season. The procedure of using multispectral reflectance for albedo estimates is not new (ie. Tschudi et al., late 90's and early 2000's) but the application to hemispheric scales is. Novel algorithm applications (ie. using ANN's) to increase computer processing time is appreciated, as is the attempt to validate the results with experimental field data from a number of campaigns. The results do seem believable and realistic based on my experience with estimating melt pond fraction from optical imagery.

I would have appreciated some more discussion around the validation/results section presented regarding the Figure 11 results. The coefficient of determination (R^2) is poor (28%) and as a result I still don't know which estimate is better or which is to be trusted

as more accurate. Why is it that MODIS underestimates the NASA results in most of the cases. There are a number of sources of error, as the authors discuss, and it may simply be due to the fact that more than 3 classes are required. Hamesiak et al., 1999 and Morassutti and LeDrew, 1995 have showed that the spectral albedo of melt ponded sea ice is complex. Not sure I see the value of Figure 11.

Why is there a second peak of melt pond fraction in July (Figure 6)? I can guess as to why but it is not mentioned in the text. IS the algorithm picking up the melt pond reflooding with ocean water once the ice has completely decayed?

Overall, I would accept this paper for publication with minor revisions.

Detailed Comments: Figure 11 caption say R^2 and correlation (should be coefficient of determination)

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