

Dear Vasily Tiknonov,

Thank you for your comment to our melt pond paper.

We have implemented the VASIA2 algorithm (including VASIA) according to the specifications given in the Tiknonov et al (2015) paper referred to, and we have tested the algorithm on the MODIS melt pond fraction data in our reference data package (Round Robin Data Package). Figures 1-4 show the results. All data have an ice concentration >90% according to the MODIS data processed according to Rösel et al, 2013.

A number of conclusions can be drawn:

1. In the MODIS data the evolution of melt ponding (melt pond fraction) increases slowly in June, peaks in July with values between 20 and 35%, and is quite stable in most of August around 15%
2. Many VASIA ice concentrations, especially in July, are between 40 and 60%.
3. Only very few VASIA SWM reach above 15% and those that do are typically larger than 40%
4. The relationship between VASIA SWM and MODIS MPF is not convincing, and most data with melt ponds according to MODIS result in VASIA SWM of 0%.
5. If SWM includes (as claimed) wet snow as well as melt ponds we would expect SWM values that are larger than the MODIS melt pond fractions in our reference dataset. This is not the case. On the contrary most SWM values are 0 or very close to 0.

Based on the above findings we do not see that the VASIA2 algorithm calculates ice areas covered by snow-water mixtures (SWM), including melted snow and ice as stated in your comment.

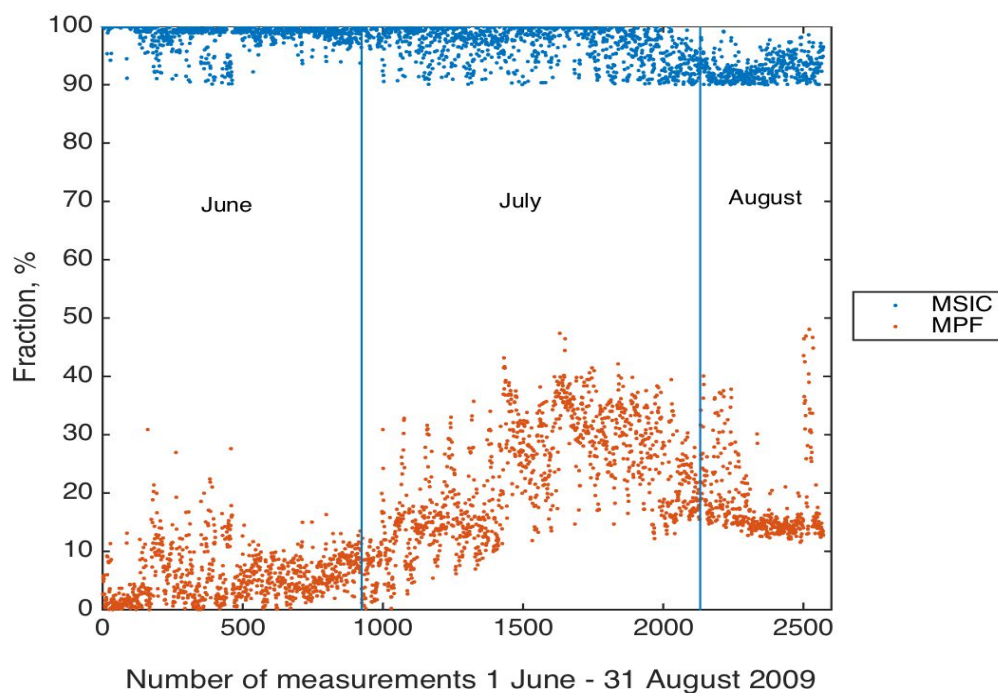


Figure 1. MODIS sea ice concentration (MSIC) and melt pond fraction (MPF). Only those measurements are selected where MSIC > 90% and cloud fraction < 5%. X-axis is just an observation counter. Vertical blue lines indicate July 1 and August 1.

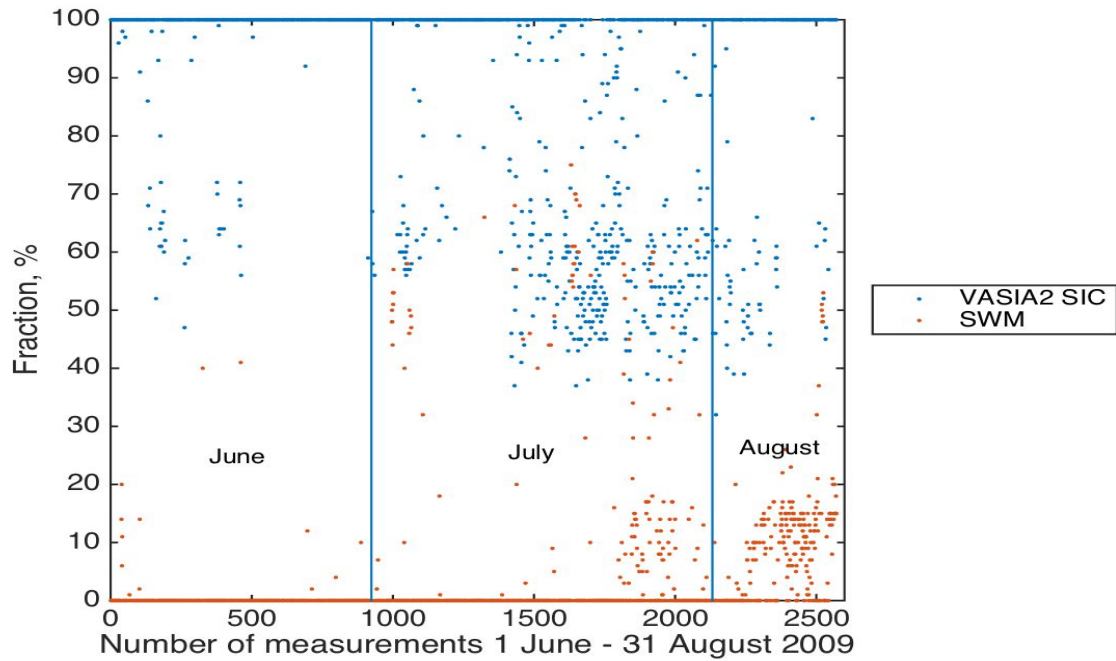


Figure 2. VASIA2 sea ice concentration (SIC) and snow water mixture (SWM). The data are filtered the same way as in Fig. 1: only those measurements are selected where MODIS sea ice concentration (MSIC) > 90% and cloud fraction < 5%. X-axis is just an observation counter. Vertical blue lines indicate July 1 and August 1.

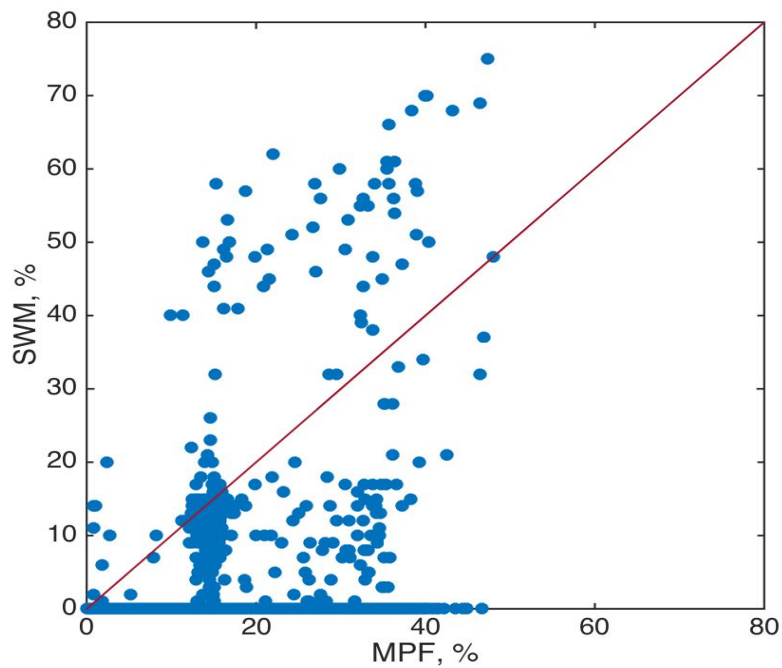


Figure 3. Scatterplot of snow water mixture (SWM) as obtained by the VASIA2 algorithm and melt pond fraction (MPF) obtained from MODIS. The red line indicates 1-to-1 line.

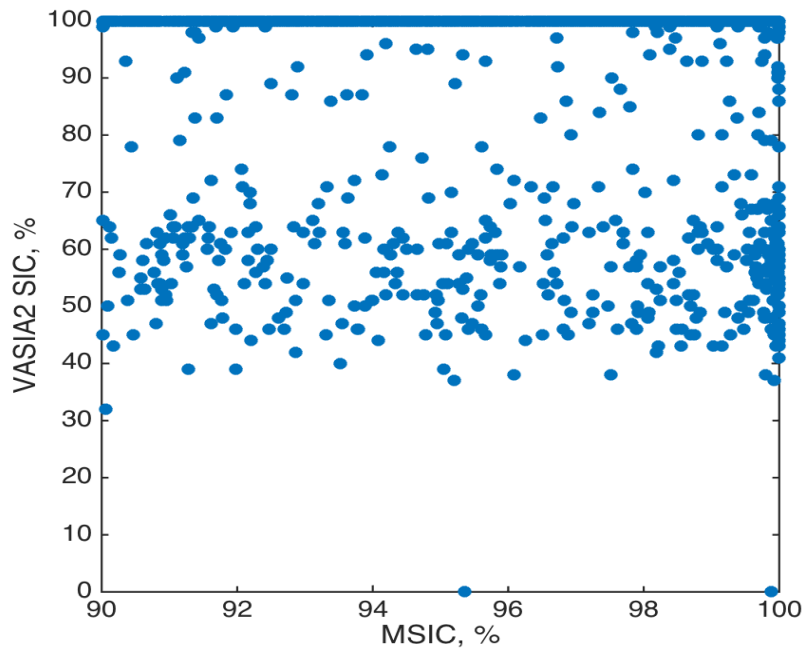


Figure 4. Scatterplot of sea ice concentration (SIC) obtained by the VASIA2 algorithm and by MODIS (MSIC).