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Interactive comment on "Screening for Snow/Snowmelt in SNPP VIIRS Aerosol Optical Depth Algorithm" *by* Jingfeng Huang et al.

Anonymous Referee #3

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The article demonstrates that the VIIRS aerosol optical depth product contains snow/ice contamination issue over high latitude Northern hemisphere. New empirical snow and snowmelt masking was developed combining normalized differences snow index, brightness temperature threshold, snow adjacency test, and spatial homogeneity test. The impacts of the new masking were tested globally and validated against ground based AOD measurements. The topic is suitable for AMT and the contents are informative for the aerosol remote sensing community. The manuscript is well prepared. However, there are several issues that need to be addressed before this manuscript is suitable for publishing.

The manuscript indicated that there are two aerosol algorithm that applied on VIIRS sensor. It is not clear the reason to have two different coefficients of snow masks in

two algorithms. Does IDPS have similar problem of masking out thick haze using the C1=0.01? Can the snow mask of EPS be applied to IDPS?

Author discussed new snow mask for IDPS and EPS throughout the paper, however, in Fig. 2 the case study for EPS is missing. Without the case study the audience do know how under what boundary conditions the snow mask for EPS is different from the snow mask for IDPS. The author failed to explain how five populations of pixels were generated in Fig. 3. Figure 5 analyzes the data loss due to different masking procedures, which is very dependent on the topography, the snow distribution and such. Only use one day as an example is not statistically significant. Figure 5 concludes that there are additional 3.44% loss of data however, in Figure 6 there are 16% (43/260) data loss for data that are collocated with AERONET. The total data loss is 37% (97/260), which is much larger than the estimates from Fig. 5. Also in Fig. 5 there are different number of latitude bins after 50 degree north. It is not clear to me the physical meaning of snow adjacent percentage is 100%. It is more likely that at that latitude, there is no data available for this day. Also, the author does not mention the quality of data whether they are "Good" data or all quality data in Fig. 6. Although the discussion of Fig. 6 indicates only "Good" data are used in the analyses, but the author should clearly state it. The one last question is with the change of snow masking, what is the statistics of valid aerosol data that are misidentified as snow globally?