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Atmospheric Measurement Techniques Discussions

Interactive comment on "Cross-comparison of cloud liquid water path derived from observations by two space-borne and one ground-based instrument in Northern Europe" *by* Vladimir S. Kostsov et al.

Anonymous Referee #1

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The authors compared the cloud liquid water path derived from SEVIRI and AVHRR with ground-based Hatpro measurements. The analyses are focused on the scale difference problem and the land-sea LWP gradient. The authors found that compared to Hatpro LWP, the SEVIRI LWP has no bias, AVHRR LWP has a positive bias. The The paper is well-written. A description of the SEVIRI dataset is missing, although the authors referred to their earlier paper.

Line 21: '. . . and a high bias () of the AVHRR results. . .'. high bias or positive bias?

Section 2: Which SEVIRI LWP dataset is used in this paper? Please give a short description of the SEVIRI LWP dataset in Section 2.

Lines 141-142, 3) The subset contains . . .: What is the size of the regular grid? '4) The AVHRR data are based on AVHRR GAC . . .' Move this item after '1) The data version is . . .'

Close to Line 275: In the WH season, r_c seems increasing with averaging interval, but not in the CD season. There are different number of SEVIRI LWP data in WH and CD. Will this impact the r_c in the WH and CD seasons?

Line 301-304 , explaining the features in Fig. 6: Why the LWP and LWPU have a linear relationship in a logarithmic scale?

Paragraph started from line 361: The authors suggest the land-sea LWP gradient is caused by the coarse resolution of the snow/ice mask used in AVHRR. Please explain what snow/ice cover data are used in the AVHRR LWP product and the spatial resolution of this data.

Paragraph started from line 383: The AVHRR images in Figs. 10 and 11 are similar to Fig. 8 but having less pixels. If you would like to save one figure, you could remove the AVHRR images and combine the SEVIRI images in one figure.

Line 433, '. . . between logarithms of D and Ve': D is not defined in the text.

Fig. 12 shows clearly that D and Ve are correlated. Perhaps it is also useful to make a linear fit of Ve and D, gives the slope and offset. How do we understand the correlation between D and Ve? As explained by the authors, there are other reasons cause the differences except for the cloud inhomogeneity. It might be possible to see the impact of cloud inhomogeneity if the LWP data are derived using the same algorithm and satellite data observed at different pixel size.

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