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Atmospheric Measurement Techniques Discussions

Interactive comment on "On the optimal method for evaluating cloud products from passive satellite imagery using CALIPSO-CALIOP data: example investigating the CM SAF CLARA-A1 dataset" *by* K.-G. Karlsson and E. Johansson

Anonymous Referee #3

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Review of amt-2013-3 Title: On the optimal method for evaluating cloud products from passive satellite imagery using CALIPSO-CALIOP data: Example investigating the CM SAF CLARA-A1 dataset Authors: K.-G. Karlsson and E. Johansson

General Comments to the Authors

The authors present a detailed method for evaluating cloud detection efficiency and cloud height products from passive satellite sensors using collocated CALIPSO-CALIOP lidar data. The example passive data set compared to CALIOP data is the CM

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SAF CLARA-A1 (Climate Monitoring SAF Clouds, Albedo and Radiation from AVHRR), derived from NOAA-18 4-km GAC (Global Area Coverage) AVHRR radiance data. The method combines 1-km and 5-km resolution CALIOP cloud products, taking advantage of better defined high thin clouds at 5-km and better cloudy vs. clear sky discrimination at 1-km. This combined data is collocated and compared to CLARA-A1 cloud mask and cloud height products.

The study is well done and the paper generally well organized and written, though there is a tendency towards wordiness. Some well-known problems in cloud detection and cloud height assignment are restated at length, perhaps unnecessarily, but they could be useful for the non-specialist. Tables and figures are easy to read and understand with clear and concise captions. I commend the authors for their honesty in reporting AVHRR results that do not always compare favorably with those of CALIOP. I am encouraged that the authors state they will use these results as a stepping stone to higher-quality products in the future. I find little fault with the manuscript in general and am recommending the paper be published with minor revisions that I detail in the specific comments below.

Specific Comments

As noted above, the paper is generally clear and well written but there is a tendency for extra words and phrases (conjunctions) where none belong. Here is a list of such locations along with a few sections that are not clear.

Page 2, line 17: eliminate “also”. Page 2, lines 23-29: these two sentences are confusing – please rewrite. Page 3, line 4: one could write “An important application in this respect is comparing satellite . . .” Page 3, lines 9-12: please rewrite this sentence. Page 3, lines 20-21: I would write, “While performing the evaluation, several issues arose relating to interpretation of the CALIPSO-CALIOP cloud data sets.” Page 3, lines 22-26: too many words. One could eliminate “so far”, “specifically”, and “similar”. Also, change “finally achieved results” to “final results”. Page 4, lines 24 and 31: Need a

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comma after “Also” and should change “use” to “uses”. Page 5, line 6: how is the 3.7 μm band used? Need an explanatory sentence here. Page 5, lines 7-11: need a rewrite here. Define channels 4 and 5, plus what does “composed over larger segments” mean? I also think a reference to the specific algorithm is needed here. Page 5, line 28: remove “have” and use “reports”. Page 7, line 5: use “fields of view” as the plural form of “field of view”, or just use “FOVs”. Page 7, line 20: be consistent with capitalization for “Calipso”. Page 9, line 1: “Cirrus” should be “cirrus”. Page 13, line 9: move “rather” to follow “efficient cloud top”. Page 14, line 8: “crosses” should be “cross”. Page 15, line 21: remove “partly”. Page 16, line 16: I think I know what “for non-separability reasons” means but please elaborate a little about exactly what is meant by this phrase. Page 19, lines 8-11: too many words here. Remove “further”, “actually”, “static”, change “that are not depending” to “that do not depend”. Remove “If” from the beginning of the next sentence. Page 20, lines 12-14: Remove “here also”; change “cloud layers and where we also always” to cloud layers and also where we”. Parentheses are not necessary in line 14. Page 20, lines 21-23: the phrase between “taking advantage” and “ISCCP definition“ is unnecessary and cumbersome. I would remove it.

Page 21, end of section: No mention is made of the limited information content of AVHRR spectral measurements for specification of thin cirrus heights. Rather than continually lowering the standard for comparison to CALIOP, I think it would be better to admit that the AVHRR is somewhat limited in its capability compared to other instruments such as HIRS or MODIS that have CO2 absorption bands. Even these instruments have limited sensitivities to the thinnest cirrus.

Page 23, lines 3-4: Remove “also the quality of CLARA-A1”, change “has been” to “have been”, and remove “Also here” from the beginning of the next sentence. Page 23, lines 29-30: Remove “Although” and change “has to be” to “are”.

Table 2: Why does the subtropical region reach so far into what most Earth scientists would call the mid-latitudes? A latitude boundary of 45N includes cities such as Min-

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neapolis, Toronto, Boston, and Beijing. Ask a resident of any of these cities in the wintertime if they live in a sub-tropical environment and I believe they would heartily disagree! The choice of latitude boundaries probably makes little difference to your results but maybe a different label could be assigned?

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 1093, 2013.