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Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparing the cloud vertical structure derived from several methods based on measured atmospheric profiles and active surface measurements" *by* M. Costa-Surós et al.

Anonymous Referee #2

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The following is an interactive comment of the article entitled "Comparing the cloud vertical structure derived from several methods based on measured atmospheric profiles and active surface measurements" by Costa-Suros and coauthors for publication in Atmospheric Measurement Techniques (AMT).

The authors have used data from the ARM SGP site in Oklahoma to deduce cloud vertical structure using the balloon borne radiosondes and active remote sensors like cloud radar and lidar. They have also used data from the GOES to characterize the

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cloud structure. The study compares different techniques proposed in the past literature to deduce cloud layers from the radiosonde data among each other and to that observed by the ground based active remote sensors and satellite data. They also propose modification to one of the technique so as to be comparable to the Global Climate Model (GCM) resolution.

This paper provides a well carried out and extensively described analysis of the differing methods to predict the CVS from radiosonde data. I can tell that the authors have been very careful and precise with their details of all the various methods and the past studies that are pertinent to their work. Without even reading the individual articles on the methods for determining CVS, I have felt like the authors in this article described each method well enough so that I have a basic understanding of each one.

While I am pleased at how detailed the authors were in their description of their methodology and all of the CVS methods, I almost forgot about the actual point of their article, which was to quantitatively assess the usefulness and correctness of each CVS method, by the time I made it to the "Results and discussion" section. THIS is the core of the article, yet it was one of the smallest sections of the article itself. The results and discussion section felt a bit rushed, and was not nearly as fleshed out as the methodology section. It is easy to completely skip over this section, especially after reading about all of the individual methods.

However, in good news, I have been pleased to see the inclusion of inter-seasonal differences in the analysis of the various CVS methods. This additional analytical comparison adds an important feature to the article that wasn't there before. I was also pleased to see a short paragraph describing a case study day that was NOT shown in a figure because it was discarded due to lack of similarity between the RS and ARSCL.

Conclusions:

I would like to hear more about application of this method to everyday scenarios. While it was an interesting study, the results themselves did not bare very high percentages of

AMTD
7, C871–C874, 2014

accuracy. This, to me, signifies that any method of CVS detection may not be accurate enough to use in order to describe the vertical structure of clouds on any given day or in any given data set (from the past perhaps). I don't feel like any of the methods are good enough to be used, with confidence, in reanalysis data for a future study (the problem would always be about HOW accurate the calculated CVS was). This is a valid conclusion, but a conclusion that I felt was not really discussed in the article. The authors did mention that they would decrease the resolution of the RS profiles so that the CVS methods could be used in various reanalysis data or the WMO's Global Telecommunication System, but they did not say whether or not these methods are actually ABLE to be used with confidence (as I described above).

Technical Corrections to the article are as follows:

Page 3683, line 7: "...they leave much of..." should read "...they let much of..."

Page 3684, line 20: "...temporal coverage however radar..." should read "temporal coverage; however, radar..."

Page 3684, line 24: "Ceilometer is very efficient..." should read "Ceilometers are very efficient..." OR "The ceilometer is very efficient"

Page 3685, line 28: "...can be valuable source..." should read "...can be a valuable source..."

Page 3686, line 27: "...concluded that Wang and..." should read "...concluded that the Wang and ..."

Page 3687, line 17: "...with different response..." should read "...with difference responses..."

Page 3689, line 24: "Otherwise, MPL first..." should read "Otherwise, the MPL first..."

Page 3689, line 26: "...while ceilometer use a ..." should read "...which ceilometer uses a ..."

AMTD
7, C871–C874, 2014

Page 3689, line 28: "...usually give a slightly..." should read "...usually gives a slightly..." Page 3691, line 6: "...(or the absence of it)..." would better read as "...(or the lack thereof)..."

Page 3691, line 13: I am confused by your meaning of "bursts"

Page 3691, line 15: "Visible images allow distinguishing the low clouds due to its high reflectance while infrared images are more useful to detect high clouds because of their low temperature." would better read as "Visible images make it possible to distinguish low clouds due to their high reflectance, while infrared imaged are more useful for detecting high clouds due to their low temperature."

Page 3699, line 19: "...available as Supplement." Should read, "...available in the Supplement."

Page 3700, line 12: "...and interpret it as..." should read, "...and interpreted it as..."

Page 3700, line 13: "...as it should be..." should read, "as should be..."

Page 3701, line 1: "...other methods are giving false..." should read, "...other methods give false..."

Page 3704, line 15: "...coarsening of RS..." should read, "...coarsening RS..."

Please also note the supplement to this comment:
http://www.atmos-meas-tech-discuss.net/7/C871/2014/amtd-7-C871-2014-supplement.pdf

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 3681, 2014.