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Atmospheric Measurement Techniques Discussions

Interactive comment on "Cloud base height retrieval from multi-angle satellite data" *by* Christoph Böhm et al.

Anonymous Referee #7

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As there are already five reviews available (and more referees have accepted the review of the paper) I can be short with my statements. I agree with what has been mentioned by the other reviewers with respect to the pre-conditions (cloud optical thickness, homogeneity), so I can restrict myself to comments mainly related to the ceilometers as this has not yet been covered in detail.

1. Section 2.1: The expression "z pixel" might be revised/improved.
2. Section 2.2: Please add 1–2 sentences to describe the type of ceilometers used, and the basic characteristics of the instrument and the cloud height retrieval. Is the very coarse vertical resolution of the METAR-messages an issue? What about using backscatter profiles from ceilometer networks, e.g. in Europe: de-

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rived cloud base heights are quite reliable and the vertical resolution is in the order of 10 meters. Please comment on this; maybe in the conclusions. Is the variability of the 30 s messages used to exclude certain data sets (temporal variability translated to spatial inhomogeneity [taking into account the bins of the messages])? The discussion of the implications of the time period of 30 minutes for averaging could be extended.

3. Section 3: Better use another word for "field of view" (R_f) here: according to page 7, line 11 it has nothing to do with the optics of the radiometers onboard of MISR as one might expect.

4. Section 3.2: Taking into account the very poor vertical resolution of the ceilometers and the large "footprint" of the inter-comparison I feel that it is not justified to end up with a $\hat{z}_{\text{base}} \approx 853$ m (pretending a one-meter-accuracy). Can you give an uncertainty instead of using "$\approx$".

   Page 10, line 17 states that a cloud base height of 7010 m was retrieved. In section 2.2 it is stated that the ceilometers have a vertical range of up to 3700 m. Please explain.

5. Section 5.2.2:

   The caption of Fig. 12 could be misleading. Mention that deviations are shown right at the beginning of the text.

   The conclusions of the papers cited in Hannay et al. (2009) are mainly based on thermodynamics. They do not cover pbl-retrievals based on backscatter. This is however relevant for ceilometers (that are used as reference in this paper). Therefore the agreement/disagreement of ceilometer-retrievals with model results should be discussed as well: a lot of papers have recently been published focussing on the potential of ceilometers in general and the determination (and its accuracy) of the mixing layer height (or pbl).

6. Section 6:

   I agree that the MIBase can be a promising tool for remote areas, and for climatological studies with the corresponding (extended) spatiotemporal averages. Nevertheless a few comments on the benefit of the retrieval based on individual observations would be desirable, considering the large uncertainty and the missing coverage of the diurnal cycle. So combination with ground based ceilometer networks (where available) should be envisaged, especially as ceilometers are a very direct and accurate approach (no calibration required, continuous operation) for z_{base}-retrievals.

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