

Interactive comment on “Quality assessment of water cycle parameters in REMO by Radar-Lidar synergy” by B. Hennemuth et al.

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Quality assessment of water cycle parameters in REMO by Radar-Lidar synergy

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Response to comments of anonymous referee 1

A revised version of the paper has been written with the referee's suggestions incorporated. The response to the particular items is listed below with page numbers

and Figure numbers of the **originally submitted version**.

General comments

- The paper has been shortened following some of the referee's suggestions (see below in the response to 'Specific comments').
- The importance of the water cycle and the attempt of an integral evaluation are stressed in the Introduction
- The uncertainty of horizontal model resolution is stated to be 'at least one mesh size'. The average model level heights and the corresponding standard deviations are given in Table 3 (Section 4.3).
The discussion of possible errors in the transformation of observations to model resolution and of the representativeness of the data is extended in Sections 4.3 and 4.4.

Specific comments

- Number of samples, correlation coefficient, bias and rmse are included in scatter plots and in the text.
- The section 'Instrumentation, measured parameters and accuracy' has been split into two subsections.
The order of the parameters has been changed, in the description of observed parameters and in the comparison with REMO. The boundary layer height is now included in the humidity section.
- Some of the suggestions to shorten the manuscript have been adopted, in particular: integrate Fig. 12 in Fig. 13, Fig. 22 in Fig. 20, conflate Tables 1 and S7101

2, shorten the introduction of the figures. Moreover, some figures have been removed (Fig. 1, 2, 5 (lower panel), 6 (middle)). This reduces the number of figures from 25 to 21.

On the other hand, we still present Fig. 23 - although the result is not satisfying - to demonstrate that the estimation of LWC from radar reflectivity is not reliable. We decided not to show examples of only two selected days because we want to illustrate certain features as clearly as possible and as little influenced by other effects as possible. The second reason is that not all days are equally covered with all kinds of data.

- Section 2.1.1: There is some more information on the Ceilometer given in the paragraph 'Ceilometer' in 2.1.1.
- Section 5.3: The deviation of surface flux values and the lower lidar-derived flux values is mostly within the error range of $\pm 50 \text{ W m}^{-2}$
- Section 6: The text has been shortened in order to avoid stating result twice.
- Section 6: The impact of clouds on radiation is not investigated here although data from the LITFASS experiment are available. The intention was a comparison of water cycle parameters and further studies of related parameters like e.g. temperature and radiation would have been beyond the scope of the paper.

Technical corrections

- Abstract, l 13: done
- Section 1, l 14: done
- Section 1, l 22: changed
- Section 2.1, l 7: changed

- Section 2.4: The phrase "humidity field" means time-height cross-section and is often used.
- Section 2.7, l 21: insert a phrase
- Section 2.8, l 11: done
- Section 2.8.1, l 3: no introductory sentence included because the section changed to a paragraph; 'evaluated' replaced by 'derived'
- Section 2.8.1, l 7-10: The text is changed.
- Section 2.8.2, l 11: done
- Section 2.9, l 14: only Fig. 25 is cited, together with the remark: 'see below'
- Section 4.3, l 28: done
- Section 5.1, l 13: done
- Section 5.2, l 2: variable name from section 3 inserted
- Section 6, 8486, l 14: changed, statistical results are cited instead of Fig. 22.
- Fig. 6: changed
- Section 6, 8485, l 22: changed
- Section 6, 8486, l 5: changed
- Section 6, 8487, l 3: comment is not clear (??)
- Fig. 13: The values based on less than 10 samples are omitted.
- Fig. 21: number is inserted
- Fig. 25: A PDF of precipitation is included and briefly discussed.