

Remarks on the revised version (v3) of the manuscript

Atmospheric boundary layer height from ground-based remote sensing: a review of capabilities and limitations

Submitted by Simone Kotthaus et al. for publication in *Atmos. Meas. Tech.*

I appreciate that the authors did consider my detailed comments on the previous version of the paper as a valuable contribution to further enhance the quality of the manuscript. I realize that my remarks and suggestions have been carefully taken into account when preparing the revised manuscript. I feel that the manuscript is now ready for publication, and I have just a few (minor, editorial) issues that might be corrected or changed with the final version.

- When reading the very first sentence of the abstract, a hint on the position of the ABL inside the atmosphere might be considered as useful. E.g. "... defines the volume of air adjacent to the Earth's surface ..."
- I still have a few points related to Figure 2:
 - In the upper right panel, the EZ could be marked by a thin region coloured with a transition colour between pink and blue (as it is done in the upper left Figure, and also in the lower right Figure at the time of profile B).
 - I am still not convinced that the evolution of CBL and SBL just start at sunrise / sunset ...
 - In line 2 of the Figure caption "horizontal velocity" might be replaced by "horizontal wind speed" (velocity would mean the vector variable).
 - It should be explained somewhere that the vertical dashed lines in the plots of the wind profile are meant to represent the geostrophic wind.
- My original comment "The link to the Rn measurements either calls for some additional explanation or it should be omitted here." has been answered by the authors in their response letter with: "Sorry, we cannot locate the sentence to which this comment is referring to." – This comment now refers to Line 200 of the revised manuscript.
- Line 277f: The original formulation "Bragg-scattered radar signal" was, to my opinion, a more precise characterization than "respective returned signal" – I thus suggest to keep the first one, since it names the process (Bragg scattering) and it makes clear that it is the radar signal in any case for which the Doppler shift is derived.
- Line 357: I suggest to add: "which is linked to the absorption of sound in the air and to ..." (note that the absorption of sound is the basic process limiting the range of a sodar).
- Line 388: I am not sure whether one should really speak about an "echo" (an "echo" usually results from reflection but not from scattering and does not experience a frequency change)
- Line 395: component → components
- Line 397f: What is meant with "multiple instruments" here? I think that this sentence basically says the same as the sentence before, it can thus be omitted while adding the "fluctuations" to the sentence before.
- Line 436: I suggest to replace "antenna" by "telescope window"
- Line 439f: "... increases with aerosol load ..."
- Line 478: "using aerosol-based retrievals" might be omitted.
- Figure 3, caption, line 4: "comprehensive" → "complete"?
- Line 493: "at fewer stations"
- Line 700: "change" → "non-stationarity"
- Line 789: "... wind and turbulence measurements ..." (note that the sodar-RWP synergy product in Beyrich and Górsdorf, 1995, is not based on the wind profile measurements, but on the backscatter signal intensities, representing the refractive index structure parameter)
- Line 1031-32: "For the detection of shallow layers a low first measurement level and high vertical resolution ..."
- Line 1093: delete "here"

- Line 1253: “Despite of ...”
- Line 1301f: Aerosol-based methods do not necessarily analyse the results just of mixing processes since the layer boundaries detected can also originate from advection, accumulation or aerosol formation processes.
- Line 1310f: “at greater altitudes”
- Line 1336: large → thick
- Line 1358: DAIL → DIAL
- Line 1661: correct: NO $\times 2$
- References in general: The authors might consider to harmonize the citations of journals: For some citations, the journal names are given in full, in most cases common standardized abbreviations are used.
- Line 2033: Maxime, H. → Hervo, M.
- Line 2122: Delete “and Iek, T.”
- Line 2124: Jore → Joffre
- Line 2142: “O’Connor” → „O’Connor”
- Line 2320: claculation → calculation