

Interactive comment on “On the ability of pseudo-operational ground-based light detection and ranging (LIDAR) sensors to determine boundary-layer structure: intercomparison and comparison with in-situ radiosounding” by C. Milroy et al.

Anonymous Referee #2

Received and published: 28 March 2011

Review of 'On the ability of pseudo...' by G. Milroy et al, AMTD

The manuscript describes comparisons of boundary layer height (BLH) retrievals from ceilometer range-corrected backscatter profiles and radiosonde temperature profiles, carried out at Mace Head station for a campaign data set over a period of one week in June 2009. The temporal-height-tracking method, published by the authors in 2010, has been modified to account for the two-layer BL-structure typically observed at Mace

C207

Head.

The agreement of BLH retrieved from three different ceilometers (LEOSPHERE, VASIALA, JENOPTIK) is related to their respective signal-to-noise ratios, larger noise degrading the detectability of aerosol gradients. Limitations in the comparability of BLH retrieved from temp-profiles and backscatter-profiles are attributed to decoupling of micro-physical and thermo-dynamical air-mass properties. This latter point would deserve some additional discussion since it has important implications for the use of BLH data in models.

The results are original and of interest to the AMT readership. I support the publication after the few minor comments have been taken into account.

Minor comments:

It should be noted clearer somewhere, how aerosol and temperature gradients are related and, particularly, what limits this correlation in more complex cases. How well does your algorithm perform in cases where e.g. Saharan dust (or other particle layers) is mixed (entrained) into the BL? How robust would the algorithm provide BLH to be assimilated into models? To which extent would it be operational? What would be the approximate hit/miss ratio and typical data coverage for let's say 6-h intervals – i.e. how often would you have a valid value within each 6 h?

p 578, l 25: typo ... influences the aerosols and turbulent mixing. ...

p 579, l 25: these limitations generally DO exist when different kinds of observations serve for retrieval of dynamically complex quantities (same for tropopause, ozonopause,...)

p 582, l.5: why should the detection of the DRCL with CHM15k perform worse than with CL31 although the aerosol signal is more consistent with the ALS 300, which has the strongest signal and serves as a kind of reference here? Could this be just an artefact of the small sample that is compared for the CL31 vs RS?

C208

Fig 5-7: enlarge the dot-symbols

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 563, 2011.