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Atmospheric Measurement Techniques Discussions

Interactive comment on "Ground-based retrieval of continental and marine warm cloud microphysics" *by* G. Martucci and C. D. O'Dowd

Anonymous Referee #1

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General remark. Retrieval method well described and illustrated, however the discussion is incomplete. The main issue concerns the temporal resolution: 0.5 min retrievals seem extremely variable. In my opinion 0.5 min averaging of the signal is far from optimum. What is the effect of averaging? In which temporal scales assumption of /almost/ adiabatic cloud with deflection makes sense? The following, more specific questions should help to address the issue. How does the signal averaged over longer time compares to the averaged retrievals? What is the optimum? Authors do not have to fully answer these questions, I believe that the problem extends far beyond this paper. However, the problem should be addressed and at least shortly discussed.

Conclusion I am in favor of publication of this manuscript after revisions.

Detailed remarks.

1. Measurements are performed in Mace Head, they concern marine stratus/stratocumulus advecting over land. Marine in a sense thatclouds are formed over the ocean (limited diurnal cycle at the surface) and are advected over Mace Head coastal observation site. Continental and marine microphysics in the title is fine, but "continental and and marine stratocumulus formed over...(P4826, 8-9) is somewhat misleading..

2. P4827, 4 "more significant mixing" - is significance result of more intensive mixing (more mass exchange) or result of more contrasting humidity and temperature air mixed into cloud? I suggest more caution here.

3. P.4830,18. Explain why your condition for excluding precipitation cases from the data is LWP(rain) > 2000gm-2. Citation?

4. P4838, 26 – as 2. Subadiabaticity is a deflection from adiabatic profile of LWC, most likely due to entrainment, but is NOT a measure of entrainment. Effects of entrainment depend of WHAT was entrained, which is partly, but not consequently discussed in P4839, 12-26. Subadiabaticity can be also effect of solar heating at the cloud top. Discussion of continental (nighttime) and marine (daytime) cases completely neglects this aspect.

5. Section 4.2. It seems that the authors are aware of the averaging /spatial/ temporal variability issue. Is higher variability of marine case related really to continentality? Is thicker cloud more variable than a thin one? Is assumption of constant CNDC in the region of full attenuation valid in a thick cloud?

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 4825, 2011.