Atmos. Chem. Phys. Discuss., 14, C12534–C12536, 2015
www.atmos-chem-phys-discuss.net/14/C12534/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Profiles of second- to third-order moments of turbulent temperature fluctuations in the convective boundary layer: first measurements with Rotational Raman Lidar" *by* A. Behrendt et al.

A. Behrendt et al.

andreas.behrendt@uni-hohenheim.de

Received and published: 7 March 2015

We thank the three reviewers for reading the manuscript so carefully and providing detailed and very valuable comments which helped to improve the manuscript substantially. We have carefully considered all comments and changed the manuscript accordingly. Please find our detailed point-to-point replies to all comments in the supplementary file together with the revised version of the manuscript including all changes marked.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/14/C12534/2015/acpd-14-C12534-2015-supplement.pdf

---

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 29019, 2014.

ACPD
14, C12534–C12536, 2015

We thank the three reviewers for reading the manuscript so carefully and providing detailed and very valuable comments which helped to improve the manuscript substantially. We have carefully considered all comments and changed the manuscript accordingly. Please find our detailed point-to-point replies below in italic and blue.

Anonymous Referee #1

This manuscript shows a case-study wherein Raman lidar data is used to derive second through fourth order moment statistics of temperature throughout the convective boundary layer and in the interfacial layer. Overall, the authors describe well how the statistics are computed, including an analysis of the significant errors from the noisy lidar data. The results are discussed well and the authors consider the large errors in their interpretation of the data. The method outlined in the paper, using Raman lidar measurements, will allow investigation of various boundary layer questions, which the authors lay out within the conclusions. The manuscript is well-written overall and data is generally good.

We thank the reviewer for these positive comments.

However, there are some questions over the application of the power law, which is the crux for many of the derived higher order statistics. In order to address this question, and several other minor points listed below, additional analysis may need to be performed leading to major revisions.

We have addressed all these points in the revised version as detailed below.

Specific Comments

Title: The title should be "Profiles of second- to fourth-order moments of . . ."

Thanks, we have changed the title as suggested.

p. 29022 Line 1: Martin et al. (2014) used UAS to identify and examine process in the entrainment zone, which should be referenced here and invalidates part of this sentence. However, UAS of course cannot continuously examine it due to a short endurance (among other issues).

We have included the reference and rewritten the text.

p. 29022 Line 10: There should be more information about the Kadygrov et al. study here, as this sentence seems incomplete. How did the thermal turbulence characteristics compare with the expected power-law within the lowest 200 m?

Information added.

p. 29026 Line 28: What is meant by "is not necessarily the case for the other cases"? What are the other cases?

Rewritten in order to avoid misunderstandings; we just wanted to stress that we discuss a case study. The reviewer misunderstood "the other cases" while only "other cases" was written.

Fig. 1.

ACPD

14, C12534–C12536, 2015