



## ***Interactive comment on “Fine-scale turbulence soundings in the stratosphere with the new balloon-borne instrument LITOS” by A. Theuerkauf et al.***

### **Anonymous Referee #2**

Received and published: 13 October 2010

I- Overall quality of the discussion paper ("general comments") The paper presents 3 important points: (a) a somewhat innovative technique (see below for 2 papers of interest), (b) the calculation of energy dissipation rates in the stratosphere, and (c) the distinction between turbulent and non-turbulent layers. The paper addresses relevant scientific questions within the scope of AMT.

II- Individual scientific questions/issues ("specific comments") The paper could be better structured: (a) From the title, we expect to see turbulence soundings from the surface to the stratosphere (or, at least in the stratosphere), so I would suggest to

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elaborate on the magnitude of epsilon, its variation (i.e., turbulent versus non-turbulent regions) and the sharp boundaries observed between the two regimes of stratospheric turbulence. The topics of turbulent versus non-turbulent regions and the sharp boundaries separating them have been barely discussed. Also, since it is claimed in the abstract that balloon launches provide high resolution turbulence soundings up to 35 km altitude, it would be nice to see a vertical profile of epsilon from the surface to the stratosphere. Such figure could be discussed in Sect. 4.3.

(b) I find that the description of the technique, in particular Sect. 2, could be shortened. For example, Eq (1) is presented in appendix A, so remove it in the text. Furthermore, the technique of estimating epsilon from hot-wire anemometry has been previously used in the troposphere, therefore I consider the presentation of your technique not as novel. Please see at least these two papers: Balsley, 2008 "The CIRES Tethered Lifting System: a survey of the system, past results and future capabilities" *Acta Geophysica*, 56(1), 21-57. This paper shows that hot-wire anemometry has already been used to estimate epsilon in particular. Frehlich et al., 2003 "Turbulence measurements with the CIRES Tethered Lifting System during CASES-99: calibration and spectral analysis of temperature and velocity" *J. Atmos. Sci.*, 60, 2487-2495. This paper is worth referencing.

(c) I would also suggest combining figures such as: - Put Figs. 3 and 4 together as (a) and (b) (under one figure number) - Same thing for Figs. 5 and 6 - Same thing for Figs. 7 and 8

III- Compact listing of purely technical corrections at the very end ("technical corrections": typing errors, etc.) The journal seems to use British English as the language, therefore words like 'meter', 'color' and 'behavior' should be changed to 'metre', 'colour' and 'behaviour'. Certainly, please be consistent in the used language: for example, 'behaviour' is found on p. 3466, line 13 and p. 3469, line 14 whereas 'behavior' is found on p. 3460, line 21. Also, please be consistent with the words 'balloon-borne' which should use a dash line, and 'high resolution' which should not require a dash

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line. In general, please see the marked-up paper (attached) for numerous suggested edits.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/3/C1698/2010/amtd-3-C1698-2010-supplement.pdf>

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Interactive comment on Atmos. Meas. Tech. Discuss., 3, 3455, 2010.

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3, C1698–C1700, 2010

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