

Interactive comment on “On the short-term variability of turbulence and temperature in the winter mesosphere” by Gerald A. Lehmacher et al.

Anonymous Referee #1

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On the short term variability of turbulence and temperature in the winter mesosphere

By G. A. Lehmacher, M. F. Larsen, R. L. Collins, A. Barjatya, and B. Strelnikov

General comments

1 The paper is one in a group of four concerning small scale dynamics in the mesosphere and lower thermosphere.

2 The present paper discusses fluctuations and turbulence as measured during four rocket flights at high latitudes.

3 The experiments described were carefully designed and successfully performed.

4 The results show an interesting relationship of turbulence intensity and the gradient of

C1

the vertical temperature profile.

5 The turbulence data are highly variable, but are within the scope of earlier measurements.

6 The paper is well written, and most of the pictures are carefully designed.

7 The paper is recommended for publication after some improvements have been made.

Specific comments

1 Page 11, lines 23, 26, and several other places: PhD theses of Szewczyk (2015) and Triplett (2016) are extensively used for comparison and discussion. This is not helpful as that work is not normally available to the reader. Please give recent citations in the general literature.

2 Please explain if the TMA experiment was anyhow affected by the bright auroral arc present simultaneously, or why not.

3 Section 2.2: Please give a sketch of the CONE instrument (ion source).

4 Figure 7: This picture is difficult to read! a) The profiles “46.009 upleg” and “SABER 64N230W...”

are almost not readable. b) The colour of the dotted line (SABER) is said to be magenta, but this is not

visible. c) Page 7, line 20: “The gaps are shown with dashed lines”: Very difficult to see..

5 Figure 18: a) Please add an arrow at the 95 km altitude. b) Please explain from where these profiles

are seen. c) Please explain the stretched parts of the profiles in the lower parts of the pictures.

6 Page 12, Eq.(4): Please give a reference.

C2

7. Page 13, l. 30-32: Why is this seen only in the SABER data?

8. Page 14, l 11: Please explain "MEMS".

9. Page 15, l 14: Please add the location of IAP.

10. Page 15, l 15: Please add "Schwetzingen, Germany".

11. Page 16, lines 30, 33: Please cite "Fritts, . . . 2018a" and "Fritts. . . . 2018b".

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