

Interactive comment on “Statistical climatology of mid-latitude mesospheric summer echoes characterised by OSWIN radar observations” by Dimitry Pokhotelov et al.

Anonymous Referee #1

Received and published: 30 December 2018

General comments:

This manuscript describes a 12-year data set of mid-latitude detections of mesospheric summer echoes (MSE) from Kuhlungsborn in northern Germany. The main result is that meridional (equatorward) transport during summer is the main process affecting the occurrence of MSE over the measurement site, which is an important result. The impacts of other potential mechanisms (solar effects, geomagnetic activity) are not that obvious. The manuscript is in my opinion suitable for publication in ACP and should eventually be published. I ask the authors to consider the following specific comments. The manuscript should also be copy-edited (e.g., in many sentences articles (i.e. "the"

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are missing etc.).

Specific comments:

Page 1, line 3: “meridional wind transport”

This phrase sounds somewhat tautological and I suggest replacing it by “meridional transport” throughout the manuscript. Adding “wind” would be justified if there were other principal ways of meridional transport. A quick google search for “meridional wind transport” also shows that is only rarely used.

Page 1, line 3: “with THE OSWIN”

Page 1, line 6: “meridional wind transport”

See comment above.

Page 1, line 12: “D-region (80-90 km).”

This suggests that the D-region is limited to the altitude range 80-90 km, which is not the case. I guess you want to express that MSE occur in the height region 80 – 90 km. Please clarify/correct.

Page 1, line 23: “during summer months with cold mesosphere”

I’m not sure, this is generally correct. The lower mesosphere will be warmer during the summer. I suggest mentioning that the upper mesosphere is what you refer to here.

Page 2, line 8: “Similarly to PMSE, a dependence on global geomagnetic activity (Ap index) was found, as well as a weaker dependence on solar energy flux.”

This is not consistent with the results presented here, right? These differences should be openly discussed later in the manuscript. What are potential reasons for these discrepancies?

Page 2, line 11: “less than ONE 11-year solar cycle”

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Page 2, line 15: “meridional wind transport”

Page 2, line 20: “data from A specular ..”

Same line: “play A significant role ..”

Page 3, line 4: “only for summer months (June-August).”

Why wasn't May analyzed? There may also be some MSE events in late May, right?

Page 3, line 7: I suggest replacing “In the analysis” by “In the current analysis” to make it clear that the statement refers to the work reported here.

Same line: “the maximum SNR value in a vertical column”

Is the entire altitude interval (50 – 120 km) used here, or only a narrower range around the expected MSE altitude?

Page 3, line 21: “a threshold of ≥ 5 MSE detections is used here.”

In which time interval?

Figure 1: A general question about your MSE detection method: If the actual occurrence rate is 0%, would your technique be able to capture that or would you always obtain an occurrence rate of a few % ?

Page 3, line 31: “Such strong MSE preference for early summer, also noticed ..”

Another reason to look at May, too.

Page 4, line 1 and Figure 2: Please comment on the uncertainty on the winds shown (statistical and systematic errors).

Page 4, line 19: “though there is a positive correlation with Kp values”

Well, looking at the figure I'm not sure I would call that a positive correlation. It must be quite weak. Is it significant? Here, the differences to the earlier studies should be discussed in more detail.

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Page 4, line 21: wrong cite command used for Bremer et al. (2016), i.e. entire citation should be in parentheses.

Page 4, line 27: “precipitation .. are” -> “precipitation .. is”

Page 5, line 18: “a number” -> “the number”

Same comment for line 19.

I would also replace “is shown by red bars” by “is shown (red bars)”, otherwise, the “as well as” may be interpreted to refer to “red bars”.

Page 5, line 26: “meridional wind transport”

Page 6, line 12: “A more sensitive ..”

Page 6, line 22: “preferences .. is” -> “preference .. is” or “preferences .. are”

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1027>, 2018.

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