Review of „Testing ground based observations of wave activity in the (lower 1 and upper) atmosphere as possible (complementary) indicators of streamer events"
By M. Kozubek et al.

In this paper, an attempt is made to relate streamer events during 15 months of analysis, particularly in the Northern Atlantic region, with signatures seen in infrasound and gravity wave recordings from ground-based microbarometer recordings in the Czech Republic, and in local ionospheric Doppler soundings. Comparison of these recordings during streamer events and during more calm conditions without obvious streamers did not reveal a significant streamer signature in the records.

The paper is motivated by a possible use of local observations for a quick identification of streamers, in addition to analyse peculiarities of GW during streamer events. The selection of streamers, however, is subjective and incomprehensible, the analysis does not following rigid and clear schemes, and the description of observations and analysis is very much lacking in detail. The authors did not find clear signals of streamers in the local observations, but because the analyses are not based on objective criteria, they can neither rule out that there could be a signal. So the conclusions to be drawn are at least vague and there is hardly any insight to be gained from the paper. I cannot recommend publishing the paper without a complete revision of the data base construction and analysis methods.

There are a number of minor grammar issues. Some of them are included below, but in addition the paper would need a careful language revision.

Major comments

Streamer events are identified by subjective criteria. However, it is not described, what "strong", "large spatial size", or "low ozone" means, e.g. by providing the order of magnitude, threshold values of meridional and zonal gradients, etc. Actually, objective criteria have been used in the literature to define streamers (e.g. Eyring et al., 2003, Krüger et al., 2005). It is also not described, how the authors analyse the irreversible mixing mentioned in line 127. In turn, it is also not clear how calm periods were identified. E.g., during the period 9.-15.11.2020, which is defined as "calm" in Table 1, considerable longitudinal variability can be found visually (see figure below taken from https://atmos.eoc.dlr.de/tropomi). So, given that the choice of calm and streamer periods is questionable or at least not convincing, any subsequent analysis based on a comparison of differences between them is inconclusive.
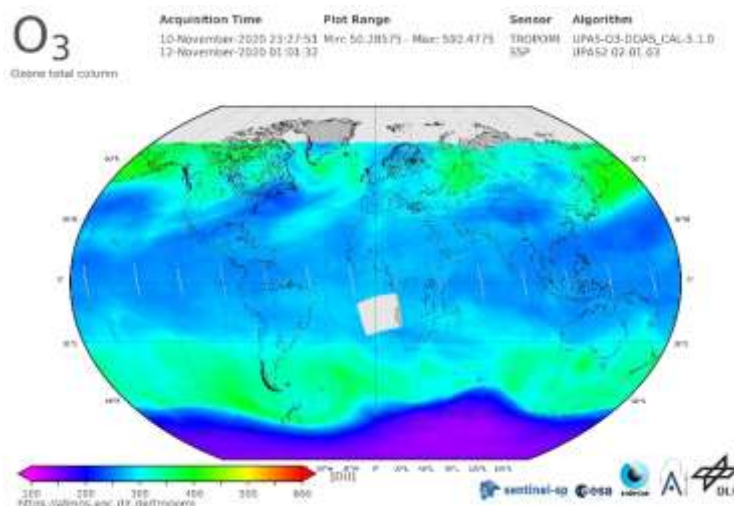
The description of the infrasound detection should be understandable without reading the literature. On lines 189-195 it is written that a configuration is set on individual basis, but how? It is also unclear what is meant with "detection bulletins". Also in section 3.1.1 it remains unclear, how the single points in Fig. 3 are obtained. What is meant by a "detection pixel"? As microbaroms are ubiquitous (see line 242), how is an infrasound record defined? And how is similarity of arrival parameters defined to obtain familys? Similarly, how is the data base to produce the histograms in Fig. 9 obtained? Did you simply used the complete time series, and calculated hourly rms values?

Similarly, more information on then ionospheric GW analysis is necessary for the reader to understand the method without having to consult Chum and Podolska, 2018. E.g., how long is a registration needed for detection of events? Provide details of the 2 frequencies, and are they operated simultaneously? Without more information it is difficult to interpret Fig. 10.

Minor comments

Abstract, first sentence: remove, there is no information in it.

L 22: explain acronyms when first used

L 23/24: insert "tropospheric" before GW, remove "in the troposphere"

l 27: what means "expected"? I assume you mean "without streamers"?

L 40: remove "upper troposphere"

L 44: introduce and describe streamer events before discussing them

L 46: closely linked. To what?

L 52: strong → strongly

L 54: focus will be on GW periods. You mean the analysis of variation sin the GW period range?

L 59: tens km → tens of km

L 63: mesosphere → stratosphere and mesosphere

L 65: wind field → wind speed

L 67: remove "us"

L 72: wind → the wind

L 92: Dopper → the Doppler

L 94: follow → follows

L 111: add dot after "al"

L 114: dynamic → dynamics

L 114: capitalize "Especially"

L 129: criterions → criteria

L 130: effect → affect

L 132: do you mean "large-scale spatial structures"?

Figs. 2 and 3: Labels should be enhanced

L 170: introduce WBCI and PVCI when first mentioned

Paragraph starting with line 196: please add more details on the sounder, e.g. frequencies, here.

L 196: using → using the

L 197: introduce acronym CDS here

L 209: from → from the

L 210: will be → was

L 211: period→ periods

L 219: streamers → streamer events

L 221: visual comparison. What is analysed and compared here?

L 228: This sentence is unclear. From one set of n_x, n_y data you obtain one value for u. So do you use different sets of x and y and calculate u for each of them?

Fig. 3: Please modify scaling to decrease azimuth range, and extend x-axis a bit so that data points don´t fall on the axis.

L 251: insert full stop after "family"

L 263: same → the same

L 266: Notice → Note

L 266: what means "results for the overall dataset"?

L 267: I did not see a transient decrease. There are 2 well defined groups in Fig. 3, separated by 1-2 days without data. Actually their frequencies seem to be those also identified in Fig 4 (for both calm and streamer periods).

Fig. 4: the two separate frequency groups are striking. Could this be analysed more?

L 349: analysed time interval. Which one is meant here? 3-7 November?

L 355: what is the difference between "streamer" and "streamer-like" in your analysis?

L 359: Visually I cannot detect differences between calm and streamer conditions in Fig. 9. The authors should consider plotting, for each parameter, both histograms in one panel after a normalisation by the overall counts.

Fig. 7: indicate that "0" means the beginning of Nov. 1 (in UT?). And the y-axis legend should read p_{rms}.

Fig 7: the data seems to be hourly values. Is the rms calculated on one hour of data each? Please provide the information.

L 377: much → a much

L 380: what is the frequency range of the observed GW?

L 389-390: Why do the recordings at the two frequencies depend differently on the time of day? Is there different signal damping, or reflection heights?

L 400-402: Is there a paragraph missing? What are the results of the statistical analysis (based on which data) mentioned in line 401?

L 455: remove "which"

L 465: What is the DTK-GPMCC software? It is not mentioned in the text.

References

Eyring, V., Dameris, M., Grewe, V., Langbein, I., and Kouker, W.: Climatologies of subtropical mixing derived from 3D models, Atmos. Chem. Phys., 3, 1007–1021, https://doi.org/10.5194/acp-3-1007-2003, 2003.

Krüger, K., Langematz, U., Grenfell, J. L., and Labitzke, K.: Climatological features of stratospheric streamers in the FUB-CMAM with increased horizontal resolution, Atmos. Chem. Phys., 5, 547–562, https://doi.org/10.5194/acp-5-547-2005, 2005.