

Interactive comment on “Assessing the role of planetary and gravity waves on the vertical structure of ozone over central Europe” by Peter Križan

Peter Krizan

krizan@ufa.cas.cz

Received and published: 13 March 2019

The manuscript describes statistics of the lamina appearance in the ozone vertical distribution in dependence of the lamina origin (due to planetary or gravity waves). Thus the subject is well suited to the journal *Annales Geophysicae*. The author uses the methodology elaborated by Teitelbaum et al (1995) to classify the lamina based on the correlation coefficient between vertical profiles of ozone and potential temperature. The reviewer has found interesting and worth publishing results. However, there is a serious problem with selection of the profiles data. Thus, the manuscript is not ready for publishing. It may have potential after additional work and resubmission. Table 3

[Printer-friendly version](#)

[Discussion paper](#)



clearly shows that the vertical resolution of the proïñÅle should be lower than 100 m for proper identiïñAcation of the lamina with size less than 1 mPa and less than 500 m for the lamina size in the range 1-4 mPa. Figure 12 illustrates strong inhomogeneity of the vertical resolution for all the stations. The same is also seen from Table 2. Lindenberg proïñÅles should be excluded from the analysis because of the large and variable vertical resolution. Thus, the analysed data are not homogeneous that may inïñCence the results. A scale of this effect needs to be evaluated in the revised paper or only the latest results with the high resolution of the ozone proïñÅles should be a subject of analysis. It means that the results shown in Fig.6 should be valid for only two stations since 1990 for the lamina size $< 1\text{mPa}$. For laminae in the range 1-4mPa the analyses will be possible for 3 stations since 1970. Thus in present form Fig. 6 is wrong especially for Lindenberg.

We excluded the station Lindenberg from the paper and we use only the stations Payenne, Uccle and Legionowo in the period 1995-2016 where the vertical resolution of the ozone profile is about 100 m.

Minor problems: I.1-2. The title is not proper: Hohenpeissenberg, Payern, and Uccle are located in the western part of Europe. It is better to change the title to "the midlatitudinal Europe".

The title of the paper was changed

I.112-116. Have you excluded from the analyses evidently wrong proïñÅles with the correction factor far from 1 (a case for early Legionowo and Lindenberg ozone proïñÅles)?

These profiles were excluded from the analyses.

I.158- 185. This section should be rewritten. In fact, Hohenpeissenberg proïñÅles are not proper for analyses of laminae with size $< 2\text{ mPa}$ as for almost the whole period the vertical resolution is $\geq 500\text{ m}$ (see Fig.12). The Hohenpeissenberg data are proper for

[Printer-friendly version](#)

[Discussion paper](#)



analysis of the laminae with the size > 2 mPa. The author could not state that similar results were derived for other stations, as for Lindenberg (all observations) and Legionowo (early observations before 1990) were not possible to identify correctly lamina with the size < 2 mPa.

We use here the station Uccle in the period 1995-2016, so this problem is solved.

I. 190 -197. Trend values should appear (% for 10 yr.) with their error estimates to discuss the trend significance. The two-joint lines trend model with the turning point in the mid1990s needs to apply also for the gravity waves laminae for better comparison with PL laminae. If you calculate the trend based on single line approach for the PL laminae you will probably result with small negative trend as you discussed for the case of the GL lamina trend.

From figure 11 we see principally different trends for PL and GL. So the piecewise regression is suitable only for PL laminae. This regression is not suitable for GL. In this case it gives insignificant trend before 1995 and insignificant change in 1995. On the other hand the classical regression is erroneous for PL and the most suitable for GL where it gives significant negative trend.

I. 215- 220. The discussion is not correct for Payern as this station is located in the valley between the Jura Mountains and Alps.

This sentence was changed.

Thank you for all your comments. They make my paper better.

Interactive comment on Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2018-123>, 2018.

[Printer-friendly version](#)

[Discussion paper](#)

