

## On "Evidence of vertical coupling: Meteorological storm Fabienne on 23 September 2018 and its related effects observed up to the ionosphere"

The presented paper undoubtedly corresponds to the profile of the journal *AnnGeo* and is aimed at studying the influence of powerful tropospheric processes on the dynamics of the overlying regions of the neutral atmosphere and the ionosphere. The subject of vertical coupling between the atmosphere layers is very relevant and has been actively discussed. The authors of the paper have written an informative review of a large number of scientific works on this subject, which certainly increases the level of scientific research.

The influence of powerful tropospheric disturbances on the overlying atmosphere and the ionosphere has been repeatedly considered in the scientific literature on the example of tropical cyclones, when the ionospheric reaction was estimated, for the most part, according to GPS-GLONASS monitoring. In the opinion of the reviewer, the absence of the analysis of these works in the introduction somewhat reduces the completeness of the approach used by the authors. Some of the methods used in the analysis of the ionospheric response to powerful tropical cyclones, and conclusions obtained from an analysis of the influence of tropical cyclones on the overlying layers, could be useful for this study. Perhaps the authors here are simply limited in size of manuscript.

The main problem in reading the manuscript is the problem with the analysis of pictures, starting with Figure 6. If sufficiently detailed signatures are prepared for Figures 1–5, other illustrations are difficult to read.

- Figures 6 and 7 according to the reanalysis of MERRA: it is not clear in what order they need to be analyzed (in rows or columns?), as the dates are difficult to distinguish even at high magnification, and in the captions of the figures and in the text itself there is no necessary explanation. In printed version this will be at all unreadable.
- Figure 8: I recommend in the caption to make an explanation of which direction of signal arrival corresponds to the color of the track on the ionogram. These inscriptions are not readable in the figures.
- Figure 9: I recommend to give explanations about what is displayed on the directograms, what physical quantity is represented.
- Figure 10: Perhaps here you should give the Kp or Ap index, otherwise the explanations of the level of geomagnetic activity in the text do not look convincing.
- Figure 13: There is no power scale. It is not clear where values are greater, where are less.
- Figure 14: The plots indicate the day of the year, it is necessary, at least, in the caption to indicate the date.
- Figure 14. The plots show the numbers of days of the year. It is necessary, at least, in the figure caption to specify dates.
- To improve perception, in all the figures it is desirable to indicate the moments of the front passage at the observation point.

Also there are a few comments to the references execution:

1. For the paper (Durand et al., 2004) (line 16 on page 5 and line 26 on page 9), the date of publication of the paper in the list of references is written 1989 (line 7-10 on page 17).
2. Similarly, for the paper (Roux et al., 2012) (line 4 on page 3), the date of publication of the paper in the list of references is written 2002 (lines 36-38 on page 19).
3. In the text there are links to articles (Hook, 1971a) and (Hook, 1971b) (lines 18, 22 on page 3). However, in the list of references letters "a" and "b" does not put on.

4. For the paper "Sanders, F., 1986a..." (line 39 on page 19) it seems that the letter "a" should be removed and the year of publication should be moved to the end of the reference.
5. The article McDonald's et al. ... (line 46 on page 18) is not in alphabetical order in the reference list.
6. For the papers (Laštovička et al., 2012; Laštovička, 2012) (line 8 on page 3) there are no letters "a" and "b" both in the text of the paper and in the list of references (lines 5-8 on page 19).

After this minor revisions, I recommend the paper for publication.