

Anonymous Referee #1:

Comment 1: “In the data processing, it is not clear what the authors did when the noon time coincided with ionospheric disturbance times such as solar flares, lightning, early events, geomagnetic storms...”

Answer 1: To address the concerns about what happens when the noon time coincides with ionospheric disturbance times, we added a paragraph explaining the connection and clarify that these events are negligible due to the calculation of the median noon amplitude per day and the overall smoothing with a longer time period of 21 days. (Lines 93-103)

Comment 2: “The color code used in the presented results are not clear and from figure to other the color code changes. For example, in figure 3 the NDK-KILL path is cyan colored but in figure 4 is violet. I recommend unifying the color coding for each path and using more forms not only two filled triangles. Also, use open forms rather than filled forms.”

Answer 2: Thank you for noticing this ambiguity. The color code used in the presented results is confusing, we changed the color coding in a way to unify the illustrations, while still showing the different dependencies of latitude and longitude. To make the different coloring clear and more visible, we choose to use different colormaps for the latitude and longitude dependency. As some latitudes or longitudes are close to each other, the corresponding propagation paths also have similar colors. While this could lead to problems in distinguishing different propagation paths, we still choose to use it to ensure the conformity with the colorbar and its monotonically increase in color. Furthermore, we switched to open forms to further improve clarity.

Anonymous Referee #2

Comment 1: “In order to clarify some needed details about the data and methods (addition X, gamma influence on VLF, etc.) I suggest the authors to create a github project with them.”

Answer 1: To further clarify the influence of x-ray and gamma radiation on the propagation of VLF waves, we added a paragraph explaining the connection and clarify that these short-term events are negligible due to the calculation of the median noon amplitude per day and the overall smoothing with a longer time period of 21 days. (Lines 93-103)

The used AARDDVARK VLF data is publicly available and can be accessed at:

<https://psddb.nerc-bas.ac.uk/data/access/coverage.php?menu=4,7&bc=1&source=1&class=284,37,140,255,243,3,110,232,141,30,279&type=ULTRA>.

As data from the GIFDS network is not publicly available, we uploaded the used GIFDS data as a Supplement to the paper.

As the method itself relies on functions from the Pandas or NumPy Python libraries, we have refrained from explaining the calculation further.

Comment 2: "In Sec. 6. Conclusion I suggest the authors to present the most important conclusions as a bulleted list or similar."

Answer 2: Thanks for your advice to better get our conclusions across. We added a bulleted list to the end of the Conclusion section to highlights our three most important findings.

Please be also aware that we have added Tero Raita as a co-author, as he manages the VLF Receiver stations in SOD and KIL, which we use in our data analysis.

Additionally, we have added some references for the revision of the method section and, moreover, some recent publications.

With kind regards,

The authors