

Answer to Reviewers

Answer to Reviewer #1:

Thank you very much for your valuable comments and for considering the results of this ionospheric trend analysis to be important.

Following are our answers (in black) to your comments (in blue).

The changes in the revised manuscript which correspond to your remarks appear in red, together with those corresponding to the comments of Reviewer #2.

In particular, regarding your comment "An important point is that in all cases the trends for the longest period of 1960-1922 are the lowest. In my opinion, it is one more proof that trends of anthropogenic origin have begun to appear somewhere after 1980":

We fully agree with this observation. Additionally, it is worth noting that 1980 coincides with the solar cycle 21 maximum. In terms of the Rz proxy, the maximum solar activity levels began to decline following the peak in 1979-1980, which aligns with the Gleissberg cycle in solar activity maxima. For F30 and F10.7 proxies, this decrease in solar maximum levels began after solar cycle 22, around 1990. Thus, it is probable that a combination of the anthropogenic effect becoming more prominent after 1980 and the decrease in solar maxima since this period contributes to the observed trends. However, this argument depends on the solar activity proxy considered. We explored this point further and added a paragraph about it in the conclusions of the revised version of the manuscript.

We also consider an important result that "hmF2 trends are more sensitive to inclusion of Ap effects more complicating regressions in the 'filtering' than the foF2 trends", so thank you for pointing this out.

About your comment "My only small comment is that there are no units of the trends at the ordinates of figs 7-10. I assume that they are km/year and MHz/year, but it should be indicated in the plots or captions.":

We added the units to the captions of the trends in Figs 7-10. You are correct, they are km/year and MHz/year.

Answer to Reviewer #2:

Thank you very much for your constructive feedback and for considering our manuscript suitable for publication. We appreciate your positive assessment of our work and your suggestions for improvement.

Following are our answers (in black) to your comments (in blue).

The changes in the revised manuscript which correspond to your remarks appear in red, together with those corresponding to the comments of Reviewer #1.

Regarding your specific comments:

- P3L96: 'E107' to 'E10.7': We corrected this typo and ensured that it reads 'E10.7' as suggested.
- P14L355: 'The are': We fixed this grammatical error.
- P20, Figure 19: In legend replace S_{N} to 'SN': We adjusted the legend in Figure 19 and replaced ' S_{N} ' with 'SN' for consistency and clarity.
- I suggest enlarging the title and the text of the X and Y axes to make them more readable: We agree that improving the readability of the figures is important. We enlarged the titles and the text of the X and Y axes in all relevant figures.

Thank you again for your suggestions.

Hoping to meet all your requirements,

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