

Anonymous Referee #2

The reviewer comments are given in normal typeface, *our responses are italicized and bold.*

In my opinion, the statement "The correlation coefficient is equal 0.51 ± 0.1 at 95% confidence level." (already in the abstract, Page1, Line16, and also Page2, Line30) is not meaningful. In both cases, the "confidence level" may be interpreted to refer to the meaning of the error bar, i.e., that 0.1 be a 2-sigma error bar, but it seems that the authors interpret more into their numbers than this. Namely, in the Conclusions (Page4, Line12), the authors say "Correlation is statistically significant and is equal to 0.51.", the error bar is not mentioned, and so the reader is expected to believe that the correlation coefficient of 0.51 itself "is meaningful".

However, as Aldrich (Aldrich, J. (1995), Correlations genuine and spurious in Pearson and Yule, Statistical Science 10(4), 364-376) explains, "...there would be a correlation of about 0.4 to 0.5 between these indices had the bones been distributed absolutely at random. (Pearson 1897).

The values of "about 0.4 to 0.5" came from a formula that Pearson developed for the correlation of x_1/x_3 and x_2/x_3 when x_1 , x_2 , and x_3 are independent random variables with equal coefficients of variation."

[The Pearson paper mentioned is K. Pearson (1897), On a form of spurious correlation which may arise when indices are used in the measurements of organs, Proc. Roy. Soc. London Ser. A, 60, 489-498, but according to the Proc.Roy.Soc. website, the correct year is 1896, not 1897]

In my opinion, this means that the level of correlation between Ap and OH temperature is well in the range of what statisticians have called "spurious", and by itself not a clear indication of a "real" effect. Only by geophysical arguments (as those which the authors do bring up) can the concept of a real relationship between geomag activity and mesopause region temperature be based.

Response:

Thank you for noticing the inaccuracy in the description of the correlation and pointing to it. The correlation coefficient of TOH and Ap-index is 0.51. The significance of correlation coefficient was tested with 14 degrees of freedom T-test. The critical value of correlation coefficient is 0.46 at the 0.05 level of significance. TOH is not correlate with F10.7, because correlation coefficient 0.36 is less than critical value. The correlation coefficient increases to 0.65 when F10.7 leads the temperature by 2 years. We agree with you that "... correlation by itself not a clear indication of a "real" effect." Therefore, we attempted to present in the article the results of a study of the effect of geomagnetic activity on the temperature of the upper mesosphere made by other researchers.