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Interactive comment on "Influence of geomagnetic activity on mesopause temperature over Yakutia" *by* Galina Gavrilyeva and Petr Ammosov

Anonymous Referee #2

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In my opinion, the statement "The correlation coefficient is equal 0.51 $\pm$ 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

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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 x1/x3 and x2/x3 when x1, x2, and x3 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. Lodon 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.

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