

## ***Interactive comment on “A combined analysis of geomagnetic data and cosmic ray secondaries in the September 2017 space weather phenomena studies” by Roman Sidorov et al.***

### **Anonymous Referee #1**

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Main point of concern:

It is not clear (to me), from the explanation of the statistical analysis given in sections 3 and 4, if the authors are analyzing only data for September 2017 or if it possibly includes other data. Note, if it is only for data from September 2017, I then wonder if the authors are using all of the data for this month and whether or not they have removed its autocorrelation.

It is important to recognize that autocorrelated time series (such as space-weather indices covering only a single month) are not statistical data (which are assumed to be independent). In this respect time series analysis and statistical analysis are funda-

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mentally different. It would, therefore, be a serious mistake to simply lump all values of a time series into a statistical analysis and fit distribution functions to them, and, even, apply tests of significance (as the authors do with Kolmogorov tests). I refer the authors to the following reference material:

Priestley, M. B., 1981. Spectral Analysis of Time Series, Academic Press, London, UK, Chapter 5.3.2.

Thiebaux, H. J., and F. W. Zwiers, The interpretation and estimation of effective sample size, *J. Climate Appl. Meteorol.*, 23, 800-811, 1984.

von Storch, H., Misuses of statistical analysis in climate research, in *Analysis of Climate Variability: Applications and Statistical Techniques*, edited by H. von Storch and A. Navarra, pp.11-25, Springer-Verlag, New York NY, 1995.

The issue of autocorrelation needs to be clearly addressed before this manuscript is considered acceptable for publication.

Smaller issue:

The abstract of a paper should be a terse summary of results. It should not be an introduction to the article (we have the “introduction” section for that). I don’t easily understand what the results are from reading the abstract. This needs to be entirely redone.

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