

## ***Interactive comment on “Brief Communication: Correlation of global earthquake rates with temperature and sunspot cycle” by R. Rajesh and R. K. Tiwari***

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1. Only in recent decades have small earthquakes been accurately counted. When selection is made for large earthquakes, their timing is statistically indistinguishable from a Poisson random process. See the following reference:

Michael, A. J. 2011, Random variability explains apparent global clustering of large earthquakes, *Geophys. Res. Lett.*, 38, L21301, doi:10.1029/2011GL049443.

2. Simply identifying, through retrospective analysis, a correlation is not a test of the significance of a correlation. The data must first have autocorrelation removed. See

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the following references:

Mulargia, F. 1997, Retrospective validation of the time association of precursors, *Geophys. J. Int.*, 131, 500–504.

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

3. Then the probability that the observed correlation could have been realized by statistical accident must be estimated, this is done using a null hypothesis of no statistical relationship. See standard books on statistical analysis.

4. And, finally, statistical tests should be applied on data that were not used to establish the hypothesis being tested. Ideally, this would be data collected after the hypothesis has been clearly and quantitatively stated.

Crack, T. C. 1999, A classic case of “data snooping” for classroom discussion, *J. Financial Educ.*, Fall, 92–97.

Feynman, R. P. 1998, *The Meaning of It All: Thoughts of a Citizen-Scientist*, 1–133 pp., Perseus Books, Reading, MA (specifically, see pages 80-81, which can be found by google search).

Yuan, K., L. Zheng, and Q. Zhu 2009, Are investors moonstruck? Lunar phases and stock returns, *J. Empir. Financ.*, 13, 1–23.

5. All of these issues are discussed in a context that is almost exactly like considered by these authors in Section 2 of the following reference:

Love, J. J. & Thomas, J. N., 2013. Insignificant solar-terrestrial triggering of earthquakes, *Geophys. Res. Lett.*, 40, 1165-1170, doi:10.1002/grl.50211.

Love and Thomas (2013) find NO statistically significant correlation between earthquakes and either of sunspot number, solar wind velocity, and geomagnetic activ-

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ity. The authors might consider how and why their work contradicts that of Love and Thomas (2013).

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