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Natural Hazards and Earth System Sciences
Discussions

# *Interactive comment on* "Defining scale thresholds for geomagnetic storms through statistics" *by* Judith Palacios et al.

**Anonymous Referee #2**

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The authors propose a geomagnetic index that might be useful for monitoring geomagnetic activity that is hazardous to Spanish power-grid systems.

My primary concern for this manuscript is the complete lack of clarity of presentation something that is possibly related to the fact that the index of interest is patented (possibly for personal profit?).

I see that the LDiñ index discussed in this manuscript is cited to a Spanish patent (Guerrero et al., 2016). Is the nature of this index "proprietary" or is its nature open for other scientists to scrutinize? If it is proprietary, then I would suggest that its use and discussion in manuscripts to be published in a scientific journal is not appropriate. Note that the traditional scientific method, and one of the primary purposes of publication in a scientific journal, is open scrutiny by other scientists. This scrutiny helps to ensure



that scientific work contributes to positive forward progress.

I found the patent by Guerrero et al. on "google patents", where curiously there are no mathematical formulas describing the index. This concerns me. Normally geomagnetic indices are defined as clearly as possible, and this normally involves mathematical formulae.

At the very least, for a manuscript to be accepted for publication, the material should be presented with sufficient detail and clarity to permit reproduction by other investigators. And, yet, when we look at this manuscript, it is very difficult to understand what this index actually is. Since the index is patented, are other investigators prohibited from reproducing the index? If so, again, this would be contrary to the normal scientific method. So, again, I am concerned about whether or not this material is appropriate for a scientific journal.

With respect to more minor points ...

Abstract should be a terse summary of results. It should not contain introductory material.

Page 1, Line 3. Indices don't inherently "have scale thresholds to quantify the severity or risk", but, rather, we humans might seek to make such assignments to the data. Page 1, Line 6, For which latitude are these indices applicable? Page 1, Line 10, what is "beta prime"? Page 2, Line 5, a reference for summarizing deleterious effects is needed. Here is a suggestion:

@book{13canetal, author = "P. Cannon and M. Angling and L. Barclay and C. Curry and C. Dyer and R. Edwards and G. Greene and M. Hapgood and R. B. Horne and D. Jackson and C. N. Mitchell and J. Owen and A. Richards and C. Rodgers and K. Ryden and S. Saunders and M. Sweeting and R. Tanner and A. Thomson and C. Underwood", title = "{Extreme Space Weather: Impacts on Engineered Systems and Infrastructure}", year = "2013", publisher = "Roy. Acad. Engineer.", address = "London, UK", pages =

"1–68" }

Page 3, Line 15, the word “spike” often denotes an artificial signal. One might instead use the word “impulse” or “rapid variation”. Page 5, Line 20, why are statistical distributions being named with such unconventional labels?

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