

## *Interactive comment on* "Characterization of HILDCAA events using Recurrence Quantification Analysis" *by* Odim Mendes et al.

## Anonymous Referee #1

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This paper has many weaknesses: the methodology is not explained in sufficient detail, the conclusions are simply not understandable, the English is very poor.

Section 2 should be devoted to explain the mathematical method. Instead, it is merely a list of nomenclature and definitions. How is the Shannon entropy used in the paper? How are the four parameters defined? What do we learn from them?

Section 4 presents the result in a very hurried and superficial way. On line 29, page 5 the Authors argue that the behaviour in Figures 1 and 2 are very similar. They look very different to me. Why should they be similar? One is storm time, the other is quite time!

I do not understand how are Figures 3 and 4 generated and what they represent.

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Figures 5 and 6 show the RP matrix, but what do we learn from them?

On line 16-17, page 6 we learn the RQA parameters calculated for the two cases, but again I have no idea what they mean, without reading their definition and physical interpretation.

Finally, I simply cannot make any sense of the three conclusions on page 7. The first one seems wrong: it cannot be that auroral activity is responsible for energy transfer from the solar wind to the magnetosphere-ionosphere. The causality relationship is obviously in the opposite direction!

Regarding the second and third conclusions I do not argue that they are wrong. I just do not understand what they are supposed to mean.

Despite all my criticism, I support the idea of using methods from dynamical systems and chaos theory to analyse geomagnetic events. It should be done, however, in a much more clear and accessible way. As it stands, this paper would not be understood/appreciated by the largest majority of the community.

Interactive comment on Nonlin. Processes Geophys. Discuss., doi:10.5194/npg-2016-62, 2016.