We respond here to the comments of this Referee. Our reply point-to-point is given in red.

Interactive comment on "Geosystemics and Earthquakes" by Angelo De Santis et al.

Anonymous Referee #2

Received and published: 16 March 2018

This article lists several possible candidates of possible earthquake precursors, including M8, RTP, PI, Shannon Entropy (information), R-AMR, LAIC, with focuses on the latter three, and suggest using mutual information as the index of correlation between these phenomena and earthquakes.

The paper has been clearly written, but the shortcoming of this study is also clear.

We thank this Referee since he indicated some weak points of our work. However we added or changed some parts of the text in order to meet this Referee requests.

As written in this article (Lines 4 to 18, Page 6), statistical seismology has been developed for many years and provides us with tools for evaluating predictive powers of earthquake predictions and forecasts. It is possible for the authors to evaluate their precursor candidates in rigorous statistical tests. But such tests are absent from this article.

We do not agree for two reasons: 1) we refer to the results of a previous paper of ours (Piscini et al. 2017) where a systematical statistical analysis is performed for Central Italy for assess the quality of the skt as possible seismic precursor. To better underline this fact, we now extended this part including also a Table (Table 2). 2) The seismic sequences of 2009 L'Aquila and 2012 Emilia earthquakes are two out of four seismic sequences occurred in Italy in the last 15 years, so they are very representative of the statistics, although the total cases are not so many. By the way, in a previous paper (De Santis et al. 2015) we even analysed a third case (2010 Pollino sequence) so finally analyzing three out of four possible cases. We added a sentence explaining this at the end of section 10.

Especially, the entropy studies can be applied systematically to a larger catalog, like the SCEDC catalog or the JMA catalog, to evaluate its overall performance, while the author only apply it to 2 cases in Italian catalog. It is hardly believable that we can draw important conclusions only based on these two cases.

It is true that we applied the entropy analysis to only two case studies, but in most occasions, we could extend the past results found in literature analyzing *b*-value to the entropy, via the equation (6). We mention this remark at the end of section 6 and 8, added also a reference (Sugan et al. 2014).

Another important issue is that in Sections 8 and 9, the completeness of earthquake catalogs is not considered for the given magnitude thresholds.

We forgot to mention that we actually checked the completeness of the earthquake catalog in both cases. We added a sentence in section 8 and in the caption of Table 1.

Minors.

Lines 13-22, Page 7. RTP has already evaluated by the gambling score, showing only marginal or no significance in predicting Eqks.

We do not agree. This affirmation by Ref. #2 is probably taken after Zechar & Zhuang, 2010. However, according to Molchan, 2011: "The statistical analysis of any prediction method with few target events and a short monitoring period is premature (this is the case of RTP)". We added this in the text and added the two references.

Lines 21-27, Pages 32. Please note that big data cannot do everything. Within the big data, there are many pairs of things that have statistical correlation by chance, but not causalities between them.

This is true. We added a warning in the Conclusions.

References

Molchan G. and L. Romashkova, Gambling score in earthquake prediction analysis, Geoph. J. Int., 184, 1445–1454, 2011.

Sugan, M., A. Kato, H. Miyake, S. Nakagawa, and A. Vuan, The preparatory phase of the 2009 Mw 6.3 L'Aquila earthquake by improving the detection capability of low-magnitude foreshocks, Geophys. Res. Lett., 41, 6137–6144, doi:10.1002/2014GL061199, 2014.

Zechar, J.D. & Zhuang, J., Risk and return: evaluating RTP earthquake predictions, Geophys. J. Int., 182, 1319–1326. 2010.