



Interactive  
Comment

# ***Interactive comment on “Review “On the relation between the seismic activity and the Hurst exponent of the geomagnetic field at the time of the 2000 Izu swarm”” by F. Masci and J. N. Thomas***

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Dear Referee #3,

Thank you for your comments.

We have taken seriously into consideration the comments of Referee #1. You can see that our replies are exhaustive, so that, the Referee #1 agrees with us and is in favor of the publication of our manuscript (see RC C214).

About the point of view of the authors of the original paper, we agree with you. If they consider it appropriate, they may submit to NHESS a comment to our paper.

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Now we want to reply to your comments.

1. Possible magnetic pre-earthquake anomalies of tectonic origin are local signals having relatively weak intensity.  $K_p$  is a global geomagnetic index calculated by magnetic observations from a planetary network of 13 geomagnetic observatories. Possible magnetic signals of seismic origin, in order to influence the value of the index  $K_p$ , would need to be observed in the majority of these 13 observatories. This scenario is not realistic.

2. An anomaly is defined as a deviation from normal (background) behavior. If we are looking for magnetic seismogenic anomalies, our background is the geomagnetic activity that we can define as “normal” with respect to the long-awaited seismogenic disturbances. Thus, if we find a close correspondence between the global geomagnetic activity level and changes of a magnetic parameter (in this case the Hurst exponent of the geomagnetic field) we can affirm that these changes are very likely part of the normal global magnetic field variations driven by solar-terrestrial interaction. Several comments on anomalous (possible seismogenic) signals reported in other works can be found in our recent papers. You can find some examples of our papers in the references of our manuscript.

3. The absence of signals during the evolution of the seismic swarm was also noted by the authors of the original paper, and they invoked “a kind of saturation” to justify it. However they do not explain the true meaning of the supposed “saturation”, nor they specify what saturated. However, laboratory tests do not fully reflect reality. These tests are carried out on dry rocks. On the contrary the rocks at hypocentral depth are saturated with fluids. Johnston and Dahlgren (2012) have shown that preliminary loading tests on rocks saturated with fluids do not show the generation of electromagnetic fields.

4. In this case the running average does not alter our findings. Namely, Figure 3a of our manuscript shows that a strong inverse correlation exists both between the  $\pm 3$ -day

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running averages and the daily values of Hu\_H and SKp index.

Johnston and Dahlgren (2012):  
<http://www.emsev-iugg.org/2012program/subpages/abstract/4-05.pdf>

[http://www.emsev-](http://www.emsev-iugg.org/2012program/subpages/abstract/4-05.pdf)

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 681, 2013.

## NHESSD

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