

Comment to “Stochastic consideration of relationship between occurrences of earthquake and fluctuations in the radio wave propagation” by K. Motojima, K. Tanigawa and N. Haga submitted to NHESD

This paper investigates the possible relationship between anomalous fluctuation in the radio wave propagations and earthquakes (EQs) with a statistical analysis of the results of the described method, based mainly on the wavelet data analysis of the signal.

This kind of articles should in principle be very useful for assessing the quality of a EQ forecast method.

The authors estimate some statistical quantities such as the probability gain (PG), the hit rate (H) and the alarm rate (A). Although the PG is quite good, both H and A are rather low, of around 10%, so precluding the real possibility to use the method for some operational forecast.

Another important point is that the paper shows much less than it could and should, and this fact deteriorates greatly its overall quality.

In particular, a better ROC analysis (e.g. Fawcett, 2006), including the use of a confusion matrix, would have been really very useful to estimate also other statistical quantities, such as, for instance, the overall accuracy that could have a better unique statistical number than PG, that depends greatly on the period of time of the investigation (even if the authors decided to consider the same +/- week period for all stations).

A second point that provides some doubts to me is the (apparent) level difference between what PG is 7 days before and 7 days after. Why is the level of PG after the EQ much lower than at around 7 days before, even if the peak is at around 1 day before? One would expect a similar plateau level at the two extremes: of does this mean that even 7 days before there is a marginal significant level of PG?

This point would suggest the extension of the analysis to a longer period of time for the investigation.

Is the EQs catalogue de-clustered? Apparently, it is not. In this case, there could be some anomalies that are actually co-seismic (of some mainshock) that are considered precursors of the corresponding aftershocks, contaminating the statistics.

Figure 4 is provided at 1-day step. What about hours before and after? From Figure 2 we notice that most of the anomalies in the three stations appear 1-4 hours before than EQ occurrence.

A figure showing the location of epicentres (w.r.t. stations positions) is missing.

A Table with complete information regarding all earthquakes (information regarding time, location and magnitude) and all anomalies (time and station) is missing. Since this table would require more space it could be even placed as supplementary material.

The general impression is that of a work that is partial and not clear as it should be expected by a paper on this delicate topic. My suggestion is the reconsideration for a resubmission after all points above are better taken into account and clarified.

Reference

Fawcett T., An introduction to ROC analysis, Pattern Rec. Lett., 27, 861-874, 2006.