

Interactive comment on “Study of the seismicity temporal variation for the current seismic hazard evaluation in Val d’Agri, Italy” by I. Baskoutas et al.

Anonymous Referee #1

Dear Editor,

This paper is discussing the temporal variation of seismicity parameters i.e. number of events, b value, energy release, for the Val d’Agri region, using the seismic catalog of the area. The authors use a new research tool that simplifies the processing of the catalog and recognize precursory patterns in the seismicity pattern, these are latter correlated with the major events in the area ($M > 4$). The paper is interesting but has a few drawbacks that need to be taken care before it is accepted for publication. My comments are given in the following paragraphs starting with general comments and progressing with specific comments on the manuscript. Overall I believe that the paper can be accepted for publication after minor revision.

-General comments:

First of all the paper needs a careful correction of English language (I am suggesting some changes in the following paragraphs). This must be corrected since in a few cases it is not easy to understand the paper.

The authors are talking about seismic hazard but I believe that their work is closer to “earthquake forecasting” or statistical seismicity, thus I would suggest to change the title and the terminology in the paper in this respect. I must say that this is upon the authors or the editor to decide.

ANSWER:

The title states clearly that this study is related to seismic hazard EVALUATION (and not Assessment), which describes another completely different methodology (PSHA or Deterministic one).

The monitoring of the temporal evolution of the seismicity parameters seems to be closer to the “earthquake forecasting”, but can also be related to the evaluation of seismic hazard in a given place.

The authors talk about a “smoothing (filter) window” but they don’t explain what is its value in this application and how much it can affect the results. They need to provide a few lines describing this parameter.

ANSWER:

The information is added (Page5, L18-19): “*The temporal variation curves of the examined parameters were obtained using a moving window $w=13$ months long and with step of one month.*”

The overall temporal variation character of the obtained curves and described by the proposed precursory pattern doesn’t change. The shorter the filter of the analysis is the better the resolution, depending on the available data.

They must also define the terms in the equations in a better way e.g. what is n in eq.1,3 ?

ANSWER:

This part was rewritten.

$n(t - w)$ is the number of earthquakes that fall in the window W

All follow suggestions for correction of English language and recommendations were considered in the revised text:

Specific comments

- Abstract

"the b value of the frequency magnitude distribution of Gutenberg-Richter relationship" -> b value of Gutenberg-Richter relationship or b value of the frequency magnitude distribution
 "were successfully correlated and 25 of them resulted false." -> correlated with what..?? 25 -> 25% or 25% could not be correlated with a change in seismicity pattern "of the current status seismic hazard" -> of the current seismic hazard status

-Introduction

"with magnitudes ranging between 2.2 and 3.2, also" -> with magnitudes ranging between 2.2Md and 3.2Md, also

"Usually to asses" -> Usually to assess

"method is to estimating" -> method is to estimate

"peak ground strong motion expected" -> peak ground motion expected

"task for area" -> task for an area

"N that occurs in a certain magnitude range, the b value of the frequency magnitudes distribution relation" -> N that occur in a certain magnitude range, the b value of the frequency magnitude distribution

-Method

"by the means of FastBEE" -> by means of FastBEE

"the medium to the topic tectonic stress acting" -> the medium to the local tectonic stress acting

"log N, is obtained by the means of the follow formula" -> by means of the following formula also note that log N is confusing here since just N would be enough the same holds for eq.1 and 3

"is the minimum magnitude of the catalogue completeness," -> is the completeness magnitude

"The standard error of the calculation is given by the relation: $\sigma_{\lg N} = 0.4343/N$," explain how is this derived ? lg is log..??

ANSWER:

Taking into account the fact that the time distribution of earthquakes obeys Poisson's law and that the root mean square (rms) error of calculation of N is

$$\sigma_N = \sqrt{N}$$

we can estimate the rms error of the logarithmic number of earthquakes, which is equal to the differential of this function :

$$\sigma_{\lg N} = 0.4343/\sqrt{N}$$

Eq.2, it seems that the index for NMmin is not written correctly

ANSWER:

It is correct.

"earthquakes in the ith magnitude" -> earthquakes in the ith magnitude interval?

This part is rewritten (Page3 L27-33)

"obtained using the follow relation" -> obtained using the following relation

"Ei is the seismic energy" -> ei is the seismic energy

??

-Data and analysis

"This analysis use seismic data," -> This analysis uses seismic data,

"Figure 3 show, from the top to at the bottom" -> Figure 4 shows, from the top to the bottom

"which epicenter can be seen" -> their epicenters can be seen

"report the lower magnitude earthquakes threshold" -> unclear needs rewriting maybe

"report the earthquake magnitude threshold that occurred ..."

This part is rewritten (Page3 L27-33)

"Because of the low seismicity," -> Due to low seismicity

"the number of earthquakes as the variance of magnitudes" -> unclear needs rewriting

ANSWER:

This part is rewritten (Page 6 L8-11)

"of the examined parameters" only on parameter is consider as reliable before e.g. on parameter log E2/3 time series only

"Namely, both parameters" only one parameter is consider as reliable before e.g. on parameter log E2/3 time series only this needs rewrite

ANSWER:

Actually we consider and we discuss the significant temporal changes in all three parameter, according to the suggested precursory pattern, despite the final result (in this case due to low number of data) were based in the analysis of just one parameter.

"of this trend coincides with the appearance of the relative, $\log E2/3$ and $\log N$ minima after that shows an increasing period." Not clear which parameter starts to increase

ANSWER:

In reality the relative minima are not measured directly from the figures (Fig 5). The numerical estimates are taken from a file, which is reporting them. The visual inspection of the figures helps to monitor these changes visually.

"period lasting until the earthquake occur, unless this behaviour changes." -> until the earthquake occurrence, unless this behaviour changes.

-Results

"followed by earthquake," -> followed by an earthquake,

"Is interesting to" -> It is interesting to

"which was started at the" -> which started at the

-Conclusions

"that fluctuates around parameters mean values in the examined over a 30-year period of observations" ->

that fluctuates around parameter's mean values in the examined more than 30-years observation period

"these changes were supposed that depict the response" -> these changes were considered to depict the response

"until the 2013 shows" -> until 2013 shows

"in given area" -> in a given area

-References

References contain a few typographical errors e.g.

"Changes in the magnitude-frequency 6-value",

"The frequency-magnitude relation of raicrofracturi'ng in rock"

Figures Earthquake no2 cannot be seen in Fig.4, 5.

ANSWER:

Because their origins date coincide.