

## ***Interactive comment on “Path and site effects deduced from transfrontier internet macroseismic data of two recent M4 earthquakes in NW Europe” by Koen Van Noten et al.***

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se-2016-150 Submitted on 03 Nov 2016 Path and site effects deduced from transfrontier internet macroseismic data of two recent M4 earthquakes in NW Europe Koen Van Noten, Thomas Lecocq, Christophe Sira, Klaus-G. Hinzen, and Thierry Camelbeeck

The paper deals with macroseismic intensity analysis when an earthquake effects interest more than one country and each one State organization/agency uses its own on-line questionnaire. The paper has several merits: it deals with crowdsourced intensity data collected through online surveys; it attempts to merge different sources intensity data, analyzing factors that operate into data compatibility issues; it raises an interesting criticism to post-code geolocation of intensities, proposing a more phys-

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ically reliable 10 km square grid geolocation, less critical than administrative driven postcode. An explanation to anisotropies of intensities found of the examined earthquakes is proposed, in terms of Q analysis and geological structures. While I find the paper interesting and potentially publishable, I have to remark some criticism on issues needed to be addressed prior final paper acceptance. Here it follows a detailed list of criticisms to be addressed:

General questions: Did you take into account the percentage of not felt to asses an intensity degree, as macroseismic scale recommends? Can you try to compare attenuation laws for each data sources?

Page 2, line 3: change real time to quasi real time. P2,I11: not complete. Pattern depends on source also, change the sentence like: Concentric pattern of intensity decay is only a theoretical very first approximation, which may serve only to indicate seismic epicentral best location. P2,I25 and I34: explain the meaning of real time or quasi real time. P5,I6: two commas (,) probably a lacking sentence. P5,I11-12: too generic: unrealistic? Manual check? What is the algorithm (objective method) behind it? P5,I20: “IDP are statistically too high or too low”, this sentence is generic. P5,I21: “too high” - “slightly overestimate intensity” the two sentences appears in contradiction. P5,I29: Mean is not very appropriate for int. estimation, if you follows intensity degrees definition you will find, for example, an evaluation of percentage of people observing such effect which it is associated an int. Value. P5,I30: statistical errors: unhappy terms in this contest, what does it mean? Probably an error component too high. P6,I19-20: check language. P6,I22: which is the time length of the catalogue? Otherwise the sentence has a poor meaning. P7,I21: Agencies are national but some collect also international data: whole set of data is international. P7,I22-28: was a statistical test conducted to assess spatial variability and localization precision of data? I think it should be worth to quantify it instead to give a qualitative evaluation based on personal opinion. P7, I35-36: “The impact of differences between the institutional questions on the intensity scale remains very low “ How can you state it? Statistical

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analysis? Referenced results? Please specify. P7, l37: Same as above: what do you mean with “spatial variability” ? Do you have a quantification of it to assert the differences among different data sources? P8,l1-2: I do not understand why merging data removes spatial variability. Merging different data sources increases variability. P10,l16-20: Here the hypothesis of normal distribution is not correct because intensity data are strongly conditioned by radial geometry and log distance attenuation laws. Explanation does not seem reasonable and well argued. Intensity data for a whole macroseismic field are not supposed to be normally distributed being influenced by the aforementioned factors plus undersampling and dependence of estimation error to intensity. P10,l21-22: This sentence is obvious: it is as to say that the whole is more than a part. P10,l31-34: Why not trying to statistically correct this discrepancy? For example making a correlation among different data set, looking for corrective coefficients. P10,l38: It is known that data deriving from non permanent effects are strongly based on compilers’ memory: it could be useful to search for a dependence of answers errors with compilation times. P11,l1-2: This sentence is not clear, entries are generally not random in time. In fact they follow a time decay law (resembling a sort of Omori law) modulated by day-night cycle. In space the distribution could be compared with spatial citizen density distribution. P11,l4-10: Intensity spatial distribution is based on qualitative evaluation and results are expressed with vague, colloquial terms, as example “far from circular radiation”. A quantitative approach could be based on analytic comparison with experimental data and isotropic fitting. P11,l13-14: But it is biased on radial areal increment due to polar distribution. Moreover IAR derived from an equal area is not sufficient to assess unbiased results. There is a need of further analysis, for example comparing attenuation relations from each agency separately. P11,l36: I find a contradiction: on one side the authors find that their data are at the epicentral zone characterized by lower intensity comparing with suitable attenuation law (Atkinson and Wald), on the other side they state that first 50 km attenuation is due to fast energy decay of seismic energy from the source. It could be explained why fast decay did not affected attenuation laws. P13,l29-30: this part is an example of uncertainties

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stemming from not considering of not felt individual reports, in fact the authors decided to reduce intensity from III to II based on reasonable consideration. Not considering not felt percentage is a weak point of the investigation. P13,l36: An other example of qualitative analysis: the Ramsgate intensity distribution shows a WNW-ESE orientation (Fig. 10), can you quantify/justify this sentence? P16,l20-30: the comparison between intensity and depth of geological structures could be done in more qualitative way, for example performing a correlation between intensity residuals and structures. P17,l1-3: depth differences of the two earthquakes is small taking into account depth estimation uncertainty. P18,l3: “why” repeated: eliminate it. P21,l46 correct family name is De Rubeis

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