Natural Hazards
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Discussions

Interactive comment on "Estimation of near-surface attenuation in the tectonically complex contact area of the Northwestern External Dinarides and the Adriatic foreland" *by* S. Markušić et al.

Anonymous Referee #1

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The manuscript focuses on the estimation of the parameter kappa and of the near-surface attenuation in the NW External Dinarides and the Adriatic foreland (Croatia). The subject is interesting and the work is worth being published. However, the use of the English language is problematic in many cases, making it hard to understand the meaning of some sentences. Improvement of the English language is required. In addition, there are certain parts that are written without justification and almost no details. Furthermore, certain Figures need to be improved. The paragraph 5 "Macroseismic field" is very weak. There should be significantly larger analysis of both the

method used for the modeled isoseismals and the obtained results. Otherwise, the whole paragraph along with Figures 7-12 must be deleted. Thus, the manuscript can be considered for publication in Natural Hazards and Earth System Sciences after major revisions. Detailed comments, corrections and additions are included, mainly as sticky motes, in the pdf file: nhess-2019-4_reviewer_1.pdf

Some of the main comments (also included in the .pdf file) are:

1. Figure 1: The start year of the catalogue must be stated. BC is too general. 2. Figure 1: Add geographical coordinates to the map. 3. Figure 1: Different colors must correspond to different focal depths and not to different magnitudes. Correct this and add color legend according to focal depth. 4. Figure 1: Magnitudes are never presented with two decimals. Correct the legend by using the symbols $<$, $\leq$, $\geq$ and $>$. 5. Figure 2: The geographical coordinates must be drawn with smaller letters. Add also the units, i.e. âŮęN and âŮęE. 6. Figure 2: Add the missing toponyms marked in the manuscript. 7. Figure 2, Legend: ML=3.5, ML=4 and ML=4.5 cannot belong to two classes. Correct the legend. 8. Figure 2: Different colors must correspond to different focal depths and not to different magnitudes. Correct this and add color legend according to focal depth. 9. Page 3, lines 17-18: "The most important seismic data were recorded during the 1960s and 1970s.". Please justify why they are the most important. Why more recent (and thus of better quality) data are not more important? They do not indicate the seismic reflector? And if no, why? 10. I propose to add available focal mechanisms in Fig. 1 (or. Fig. 2) and comment them in the last paragraph of Section 2 (page 4). 11. Page 4, Line 14: "Selection of the local magnitude and epicentral distance limit values plays a major role in calculating ðİIJĚ". You explain the role of the magnitude threshold, but not of the epicentral distance. Add a sentence regarding its importance. 12. Figure 3: Unfortunately, I cannot understand anything regarding the azimuthal distribution of Re and ML. There is no legend explaining the colors. It certainly has to be added to see if the figures are understandable. 12. Page 4, line 30: "Recordings with an FAS that deviated from

the exponentially decaying trend at high frequencies". Add an explanation regarding the cause of this phenomenon. 13. Page 5, lines 31-32. "while the higher κ values are probably due to the higher attenuation zone of alluvium of rivers near Karlovac." No κ values have been presented yet. Thus, the comment is misplaced. It must be deleted from this part. 14. Page 6, lines 6-7: "The errors for the epicentral distances were set to 5 and 10 km". Which criteria did you apply to choose these values? When did you use 5 km and when 10 km? I think these values are too high for recent well-recorded events. 15. Page 6, lines 21-22. "individual ðÌlJĚ values are plotted using an interpolation method" Which interpolation method? Clarify. 16. Page 6, lines 27-28: "For some stations, the conclusions should be taken with reserve" For which stations? Clarify. 17. Page 7, lines 6-9. "Weaker attenuation properties (see Fig. 5) may also probably be caused by S-wave reflection from different parts of the shallower Mohorovičić discontinuity (see Fig. 6), at a depth of about 25-30 km (e.g., Gentili and Franceschina, 2011). This is exactly the case for the Adriatic foreland part along the southwestern coast of Istria, were the Mohorovičić discotinuity depths vary from about 27 km (Finetti, 2005) to approx. 40 km (Grad et al., 2009)." If you wish to keep this paragraph you have to explain in detail the relation between Moho depths and attenuation properties. Otherwise it has to be deleted, along with Figure 6. 18. Page 7, line 19: "Relatively high values of attenuation were found in the fault zone". Which fault zone? Clarify and provide more details. 19. Page 7, lines 21-22: "There is also a possible relation between the kappa and the ND-anomaly in the area of Gorski kotar (e.g., Šumanovac and Dudjak, 2016; Šumanovac et al., 2017), that partly fit the observed kappa decrease". I cannot understand what you mean. Provide details and clarify. 20. Page 8, line 15: "Some studies indicate the possibility". Do not use phrases like "Some studies". Indicate which studies (citations). 21. Paragraph 5 "Macroseismic field: This is the weakest part of the submitted manuscript. The methodology is almost not described at all and there are six figures (half of the total number) that are almost not commented. I propose to delete this paragraph along with the 6 figures. Otherwise, it must be re-written with caution. It is evident that there are many differences between

modeled and empirical isoseismals. But this is not written in the manuscript. 22. Page 9, lines 4-6 (if you decide to re-write and keep Paragraph 5): "The distribution of macroseismic intensities, when studied through isoseismals, usually reveals the main tectonic features of the felt areas. Furthermore, by studying the macroseismic field, the main characteristics of near-surface attenuation can be defined". Again, this is not justified. How do you prove this? Add citations and examples. And what do you mean by "usually"? In which cases it reveals and in which it does not? Again, provide examples and citations. 28. Paragraph 6 Estimation of near-surface attenuation – a summary and some conclusions. I propose to delete the following parts: a. Page 9, line 21: "empirical and modelled macroseismic fields" b. Page 9, lines 27-30: "Given that the modelled macroseismic fields are well matched with empirical data, and also based on observations of near-surface attenuation as defined based on the kappa parameter, the modeling performed in this paper is applicable when assessing local near-surface attenuation (in the investigated area) under the assumption of a realistic earthquake scenario;" c. Page 10, lines 8-9: "It may very well be that the observed lower attenuation west of the southwestern coast of Istria is caused by S-wave reflection from parts of the Mohorovičić discontinuity at depths below 30 km;" d. Page 10, lines 18-19: "Furthermore, the use of the SAF model (Sović and Šariri, 2016) based on realistic earthquake scenarios enables prediction of attenuation in specific areas."

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-4/nhess-2019-4-RC1-supplement.pdf