

Interactive comment on “Tectonic styles of expected earthquakes in Italy as an input for seismic hazard modeling” by Silvia Pondrelli et al.

Silvia Pondrelli et al.

silvia.pondrelli@ingv.it

Received and published: 10 July 2020

Dear Referee 1,
thank you for your useful suggestions and comments. Following the scheme you proposed us, we modified substantially the manuscript, that now has a more coherent shape.

In the following we answer point by point to your comments.

REF1: First of all, the paper needs to be better structured, better organized. For example, line 171 and the following (the main purpose of the study) should go at the beginning (Introduction), not in the middle of the methodology section. Same with lines 131-139.

C1

ANSW: We agree with the reviewer and we reorganised the paper following the suggestions.

REF1: There are more examples of disorganization highlighted in the pdf attached. I strongly suggest the authors to follow a classical scientific paper structure, like: Introduction, Seismotectonic framework, Data and Methods, Results, Discussion and Conclusion. Second, I encourage the authors to make an effort using better English and, particularly, a more formal style. In the pdf attached I have highlighted across the manuscript many phrases that need to be rewritten.

ANSW: Done following the “classical” scientific paper structure.

REF1: Additionally, your writing has to be more precise and specific. Give explanations when necessary (eg, lines 133, 150,. . . and so many others highlighted in the pdf attached). **ANSW:**Done.

REF1: The following comments are organized in sections; those that a future revised version of the manuscript should contained in order to be accepted for publication in NHESS:

-Introduction section: Start stating the importance of the issue, why and how this is used in PSHA. If there are any other previous work, it should be mentioned here (and there is one, at least). Identify the problems tackled in previous work. Coherently state your objective. Highlight the originality of your approach. **ANSW:** An entire paragraph in the Introduction is now dedicated to the relevance our results may have in the use in PSHA. We also moved and implemented here the description of previous work and motivations to go further with respect to it.

REF1: Explain what a “cascade” criteria is, what makes it better from “normal” criteria?

ANSW: We removed the term “cascade”, as we used “normal” criteria for selecting the focal mechanisms.

REF1: Across the paper you are using the term “tectonic style”, which is very geo-

C2

logical. I rather suggest you to use “style-of-faulting” which is more commonly used in PSHA literature. **ANSW:** We changed the term all over the manuscript following the reviewer suggestion.

REF1: -Seismotectonic framework (missing section): Additionally from what you say in your introduction, I strongly suggest to add a map of active faults of Italy (a new Figure), from the European database for example (SHARE project). Discuss the kinematics of the active faults from geological field data in each of the seismic zones with the focal mechanisms available, are they consistent? **ANSW:** In figure 1 we added the composite seismogenic sources taken from the Italian database DISS 3.2.1 (<http://diss.rm.ingv.it/diss/>). We also briefly discussed the consistency between available focal solutions and seismogenic structures of the seismotectonic model.

REF1: - Data and Methods (missing section): This new section could begin with your “collecting seismic moment tensors” (Data) and followed by your “Seismic Moment Tensor summation and selection criteria” (Methods). Table 1 presents the final results, but Table 2 represents a previous process that is used to get to the results of Table 1. . . I believe that Table 2 should go before Table 1. **ANSW:** Yes, we agree with the reviewer. We modified the order of the Tables to have a more coherent content.

REF1: I would rather use the term “reverse fault” than “thrust”. A “thrust” is a particular type of reverse fault (a low-dipping reverse fault), while “reverse” is more general for the purpose of your research and for its application in PSHA. **ANSW:** Done.

REF1: - Results section: This new section would include your “Tectonic Styles and expected focal solutions in the ZS16 Seismogenic Model”. The Table with the results (your Table 1) should come here. **ANSW:** We agree with this comment and so we modified according to the reviewer suggestion.

REF1: - Discussion section: Please, produce a proper Discussion section, independent from a Conclusion section. Start the discussion from line 282 onwards. You could add in your discussion the agreement or not between geological field data (kinematics

C3

of active faults) and your results. **ANSW:** Done.

REF1: - Conclusion section: You could put here lines 277-281, though more developed (for instance, you could also mention the style-of-faulting depth-dependency found, and so..). Briefly explain the style-of-faulting assigned to each major geological region of Italy. **ANSW:** Done.

REF1: FIGURES: The digital terrain models on the background of the figures could be much more detailed. Try to produce more attractive figures. It is compulsory to add a geographical frame (coordinates!). **ANSW:** Now all figures have been changed, using a better topography and a proper geographical frame.

REF1: A new figure showing a map of active faults of Italy is really important. **ANSW:** Figure 1 has been modified following this suggestion.

REF1: Figure 4 has three sections, a, b and c. The foot caption should refer independently to each section. A better explanation of the graphs is needed. **ANSW:** Done.

REF1: Figure 6 needs to differentiate the three different captions with letters (a, b, c). **ANSW:** Done.

REF1: TABLES improve formatting (table 3 is different). **ANSW:** Done. **REF1:** There is a typo in “Idria”. **ANSW:** Idria is the correct name of zone n.1.

REF1: Table 1 should be 2, and conversely. **ANSW:** Done.

REF1: Please, double check you are using the right format when citing web pages (check the journal guidelines), and in tables and figures. **ANSW:** Done.

REF1: Check the pdf attached for more corrections and comments (highlighted in yellow). **ANSW:** We reviewed the manuscript following all the suggested corrections and the comments.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-70>, 2020.

C4