

## REPLY TO REVIEWS

This document presents a point-by-point reply to the comments received by our manuscript during the review process. We benefited from detailed reviews by two reviewers, one anonymous, one signed. In the following, we recall the comments to our manuscript in each review and describe the way in which each one of them was considered to prepare the revised version of our manuscript. We took the opportunity of this revision to check again our text. We corrected typos and improved English usage in three or four places through different word choices.

### **Comments by Anonymous Referee #1**

First we would like to thank Anonymous Referee #1 for reviewing our manuscript. We thank him/her for his/her positive appreciation of our manuscript. His/her review raised a few points where our manuscript needed to be improved. We recall those points and indicate the way in which we modified our manuscript to solve the Referee's concerns. The changes made to the manuscript to solve this referee's concerns have been highlighted in yellow in the marked-up version of our revised manuscript.

*Abstract: Enter the dates and main characteristics of the earthquakes indicated.*

We have added additional details of the earthquake that is mentioned there.

*Page 3: Insert a table of the earthquakes described.*

A table was added to the manuscript with the requested data.

*Page 4: Insert some stratigraphic columns and shear wave velocity profiles.*

We do not think it adequate to include stratigraphic columns in our manuscript. We believe that a discussion of the different soil types present in Armenia and of the subsoil structure would deviate our manuscript from its main subject: the vulnerability of the building stock in the city. However, we added a sentence to indicate that a thorough discussion of that subject was included in part I of our study. In contrast, we did prepare a table with data of the soil profiles at two sites in the city of Armenia and included it in the revised manuscript. Those two sites are representative of the range of variations of shear wave velocity and soil thickness throughout the city. This addition required the modification of Figure 2, where the location of those two sites is now indicated. We took this opportunity to improve additional details in Figure 2.

*Figure 2: Enter the text in English.*

We do apologize for this oversight. We do not understand how could the caption of Figure 2 manage to slip into the submitted document in Spanish. This blunder has been corrected.

We thank again Anonymous Referee #1 for his/her remarks that were helpful to improve and correct our manuscript. Thanks to him/her our revised manuscript has been improved relative to our original submission.

### **Comments by Dr. Francesco Panzera, Referee #2**

First, we would like to thank Dr. Panzera for his review of our manuscript. His report includes a general evaluation of our manuscript, four comments pointing to details that could be improved in our text, and a general comment concerning a more significant topic. In the following, we recall each of the reviewer's objections and describe the way in which our revised manuscript takes into account the reviewer's comments. The changes made to the manuscript to solve the concerns of Dr. Panzera have been highlighted in green in the marked-up version of our revised manuscript.

#### *General evaluation of the manuscript.*

Dr. Panzera first describes briefly the contents and intent of our manuscript. We thank him for his positive judgment of our work.

#### *Line 57: add "of buildings"...*

Modified as requested.

#### *Line 82: add some worldwide references...*

The referee suggests adding to our reference list four papers that cover similar subjects as our manuscript and highlight cases that occurred in areas removed from our case of study. We thank Dr. Panzera for providing the links to the publications, which eased access to those papers. After reading them, we added references to three of them. The fourth paper deals with a subject that is removed from the substance of our manuscript. Its emphasis is on equations to predict intensities and the Swiss geologic-tectonic classes and is not a useful reference for our case. However, we have added a fourth reference to another study that compares ground motion amplification with observed damage estimates for a case study in Greece. The addition of these references has broadened significantly the geography of referenced papers in our manuscript. In addition, they simplify the way (through the references included in those four papers) for interested readers to access more papers on our subject.

#### *Line 86: change "relatively small"...*

Modified as requested.

*Line 184: “the geological formations...”, please specify the used geologic map scale.*

The referee is correct. It is important to indicate the scale of the geological map. The revised manuscript corrects this oversight.

*General comment.*

Finally, in a general comment, Dr. Panzera suggests us to improve the discussion around the possibility of site effects contributing to irregular damage distribution. We thank him for this remark that identifies a point where our manuscript could improve. In response to this comment, we point out here that this manuscript is the second part of a study on ground motion of the 1999, Armenia, earthquake and the understanding of the factors which played a role in the damage observed during that event. A detailed account of ground motion, subsoil structure, and site effects in Armenia is the main subject of part I of our study. However, the general comment from Dr. Panzera indicates that our manuscript could better emphasize that site effects were dealt with in part I of our study. In addition, our current manuscript, part II, does require to be self-contained. For this reason, we have added some comments regarding the possible double resonance effect (soft soil resonance coupled to building resonance) and the way in which we consider that site effects contributed to the observed damage.

Finally, we thank again Dr. Panzera for his remarks and the careful evaluation of our manuscript. His review identified weak points in our manuscript. As a result of his review, our paper has been improved.