

## ***Interactive comment on “Shallow subsurface geology and seismic microzonation in a deep continental basin. The Avezzano Town, Fucino basin (central Italy)” by Paolo Boncio et al.***

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Author reply to referee #3 comments on “Shallow subsurface geology and seismic microzonation in a deep continental basin. The Avezzano town, Fucino basin (central Italy)” by Paolo Boncio et al.

REFEREE:

The manuscript describes the construction of a level 1 seismic microzonation map of the Avezzano town in central Italy. It begins with an overview of the studies area, proceeds with describing what a seismic microzonation is, and continues with describing the types of data collected for this research, and the data itself.

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GENERAL COMMENTS:

The work itself is very local, although it can serve as a “guide” for other places in the world. The authors state that the SM was carried out according to the guidelines for the SM by the Italian Department of Civil Protection. It is not understood whether there are new approaches or methodologies presented here. If there are, the authors should emphasize them. Otherwise, this manuscript is very technical, and offers no new insights to the field of seismic microzonation, and its results, although important to the Town of Avezzano, are very specific.

RESPONSE: We would like to thank the reviewer for the comments. We agree that methodological aspects of the work should be better valorized. In fact, the paper has not only local interest as:

The structure of the Geological-Technical Map (G-T Map) proposed in this paper represents a new methodological approach compared to that required by the Italian SM guidelines. In fact, the Italian SM guidelines, published in 2008 (see SM Working Group, 2015 \* for the English edition), do not provide technical specifications for the G-T Map. Some implementations have been published more recently (e.g., Martini et al., 2011\*\*; “Standard di rappresentazione e archiviazione informatica. Microzonazione sismica. Versione 4.0b, 2015” available online at [http://www.protezionecivile.gov.it/resources/cms/documents/StandardMS\\_4\\_0b.pdf](http://www.protezionecivile.gov.it/resources/cms/documents/StandardMS_4_0b.pdf)). These implementations provide some guidelines for the G-T Map that favour the mapping of textural features for cover soils (gravel, sand, silt, etc.) and geo-mechanical features for the geological bedrock (lapideous vs pelitic vs interlayering, stratification, fracturing, etc.). A number of basic geologic data, necessary for the 3D reconstruction of geological bodies, are lost (chronostratigraphic relations, sedimentary environments, etc.). In any case, specific instructions for building the G-T Map are not provided. The aim of this work is not to modify the Italian guidelines, but we propose an original methodological procedure for building a G-T Map for SM which might be of interest for scientists and professionals working in the field of SM, in Italy or

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elsewhere. This procedure was adopted for basic (Level 1) SM of the Abruzzo Region. The proposed methodology and the resulting G-T Map preserve basic geological data, and implement them with additional lithological-technical features useful for SM.

This paper represents a new case history in the scientific literature, with potential interest for other areas with similar geologic context;

We also agree with the statement from the anonymous Referee #4 “The study of the geological, morphological and structural factors controlling the local seismic site response can potentially represent a significant contribution of broad interest, considering that several old villages and towns of central and southern Italy are located in comparable geological and morphological settings”;

In order to clarify these points, we will modify the “Introduction”, the “Methodology” and the “Discussion and Conclusion” sections.

REFEREE:

SPECIFIC COMMENTS:    Page 1, line 12, page 4 lines 5, 15, 21 and in many more places – spacing between words is missing.    Page 2 line 8: I believe “from” should be “for”.    Page 2 line 15: “in the hanging wall should be “on the hanging wall”.    Page 2 lines 16-17: the sentence beginning with “Nevertheless. . .” should be re-written.

RESPONSE: We will correct.

CITED REFERENCES \* SM Working Group (2015) – Guidelines for Seismic Microzonation. Civil Protection Department and Conference of Regions and Autonomous Provinces of Italy. 1 Vol. English edition of: Gruppo di lavoro MS, Indirizzi e criteri per la microzonazione sismica, Conferenza delle Regioni e delle Province autonome – Dipartimento della protezione civile, Roma, 2008, 3 vol. e Dvd. Available online at [http://www.protezionecivile.gov.it/httpdocs/cms/attach\\_extra/GuidelinesForSeismicMicrozone](http://www.protezionecivile.gov.it/httpdocs/cms/attach_extra/GuidelinesForSeismicMicrozone)  
\*\* Martini et al. (2011) in *Ingegneria Sismica* XXVIII,2, 2011, available online at

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[http://www.protezionecivile.gov.it/resources/cms/documents/aggiornamento\\_indirizzi\\_microz](http://www.protezionecivile.gov.it/resources/cms/documents/aggiornamento_indirizzi_microz)

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-313, 2016.

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