Nat. Hazards Earth Syst. Sci. Discuss., 1, C3138–C3140, 2014
www.nat-hazards-earth-syst-sci-discuss.net/1/C3138/2014/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Investigation of the influence of topographic irregularities and two dimensional effects on the intensity of surface ground motion with one- and two-dimensional analyses" *by* L. Yılmazoğlu and G. Ç. İnce

Anonymous Referee #2

Received and published: 4 June 2014

The authors deal with the use of one- and two-dimensional analyses (EERA, Deepsoil, and Plaxis software) to assess the influence of topography on seismic ground motion. To reach the fixed aims the authors consider the historical peninsula of Istanbul as a case study. The work is interesting and quite well-organized, the length is appropriate as well as the figures. However, it presents some points that need to be considered more in depth. Taking into account that the manuscript was already analyzed by another reviewer I will leave out of this note the points that were already highlighted.

Introduction The paragraph starts with general considerations about the factors influencing the amplitude and frequency of seismic wave but does not show a proper analysis concerning the literature about the core of the manuscript. Therefore, it is necessary to add suitable references dealing with the subject. I suggest some references that, however, should not be considered exhaustive. The analysis of literature will also show how separating the contribution that soil and topography give to the seismic amplification can be a hard matter. The paragraph ends unexpectedly without introducing the case study and the essence of the manuscript.

Geology and topography of the region To introduce the case study appropriately it is necessary to give an overview of the importance of the area looking at the regional seismic hazard. Furthermore, it is necessary to add a brief discussion about the tectonic of the area with special attention to the faults. This aspect will help to constraint the discussion about the results of the numerical analysis (see below).

Change of peak ground acceleration values on the surface To readability of the paragraph is not always easy. To increase it I suggest joining each cross geological section (figures from 3 to 7) with the correspondent figure showing the change in peak ground acceleration (figure from 10 to 14) arranged all the figures with the same graphic scale. Though the map in Figure 1) has not an adequate resolution to catch the detailed picture of the geology, it seems that the study area is dissected by important regional-tectonic lineaments that can act as a waveguide trapping the seismic energy. Can the authors make some considerations about the role of this tectonic zone on seismic waves?

Minor points:

Abstract. To introduce the acronym EERA here. It is not suitable to cite the 5-5' section if it has not defined yet. To change this point taking advantage of the authors' response (page 2) to the Referee dated 23 April 2014.

2.2. Topography Page 5, line 15, to change "...to produce a three-dimensional

image. . .” in “to generate a DEM. . .” Page 5 line 18, to avoid confusion among number of sections and their names I suggest changing “. . .into 5 cross. . .” in “. . .into five cross. . .”.

3.1 One-dimensional analysis Page 8, line 5, to change “. . .transmission speed . . .” in “. . .propagation velocity. . .”. Page 8, line 12, to change “. . .ground reaction. . .” in “. . .ground response. . .”. To begin a new section when a new argument has been introduced (e.g.: page 9 line 13)

4.1. Change of peak ground acceleration values on the surface Page 13, line 17. The meaning of the “Weak rock” should be clarified. Did you mean “fractured rock” or “poor geotechnical properties”?

Figures Figure 2: To add the North arrow, the geographic coordinates, the inset illustrating the location of the study area as respect the regional context (the same should be made for Figure 1).

References suggested to the authors

Assimaki, D., Jeong, S. (2013). Ground-Motion Observations at Hotel Montana during the M 7.0 2010 Haiti Earthquake: topography or Soil Amplification? Bull. Seis. Soc. Am. 103(5), 2577-2590.

Hough, S.E., Altidor, J.R., Anglade, D., Given, D., Janvier, M.G., Maharrey, J.Z., Meremonte, M., Mildor, B.S., Prepetit, C., Yong, A. (2010). Localized damage caused by topographic amplification during the 2010 M 7.0 Haiti earthquake. Nature Geoscience 3,778–782

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 7193, 2013.