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Natural Hazards and Earth System Sciences
Discussions

# *Interactive comment on* "Effects of soil settlement and deformed geometry on a historical structure" *by* Y. Yardım and E. Mustafaraj

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I read the manuscript with interest. It reports the results of a research which proves the usefulness of TLS data to assess the effects induced by local geology and geotechnical soil properties on structural stability of historical buildings. It is also interesting to see the method applied to a monument which was also affected by human interventions, and the authors provided insights into this aspect. I hope that further buildings of local heritage can be studied with this tool.

My comments mainly concern data presentation and the level of information provided that, at some points, can be improved:

1) Title: I feel that the title probably does not provide a complete figure of the manuscript



content, because it does not contain any specific reference to the technique (i.e. TLS) and/or approach used (i.e. FEM). Maybe a slight change of the title would enhance the specific character of this research paper.

2) Authors provide a good state-of-the-art of TLS and references to previous research in the 'Introduction' section. Nevertheless, no reference is reported with regard to the use of TLS data to retrieve a geometric support to interpretation of other type of structural monitoring/assessment data. This is a topic currently being investigated in the research field of cultural heritage, and the authors may want to add a specific comment about this, also considering the addition of the following recently published reference:

Tapete et al. (2013) Integrating radar and laser-based remote sensing techniques for monitoring structural deformation of archaeological heritage. Journal of Archaeological Science 40 (1): 176–189.

This paper indeed discusses (and reports/comments the associated scientific literature) about the use of 3D point clouds and derived 3D models for structural assessment of historical buildings and archaeological monuments.

3) P. 5915, line 16: the authors cite Gigli et al. (2009). A deeper discussion about the use of TLS for deformation analysis anticipated in Gigli et al. (2009) has been published in NHESS more recently:

Gigli et al. (2012) Instability mechanisms affecting cultural heritage sites in the Maltese Archipelago, Nat. Hazards Earth Syst. Sci., 12: 1883-1903.

The authors may want to add this reference to the already cited one.

4) P. 5916, Lines 18-28: geotechnical data listed and commented here may be organized by adding a dedicated table. Or, otherwise, the part of Figure 1 which sketches the stratigraphic column and summarizes the geotechnical properties of all the geological strata could be enlarged to become more easily readable.

5) Some of the figures can be improved. E.g.

Figure 1: a reference to explain B1-B4 would be helpful for understanding. Indeed these labels do not find any reference or clarification through the text.

Figure 2: the authors may specify the date of the old photograph (if known or inferable from background knowledge).

Figure 5: can the authors add the legend of the thematic map of the façade, as well as a reference to $\Delta$ angle within the caption?

Figures 7-8: The tables embedded into these figures might be moved to proper tables.

Figures 7-8: Although the text associated provides some guidance, these Figures are not fully self-explanatory. E.g. what does the colour scale of Figure 7 measure? Which is the measurement unit?

I hope the above comments can help the authors to improve the already well-structured manuscript.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 5911, 2013.