

## ***Interactive comment on “Calculation of coseismic displacement from Lidar data in the 2016 Kumamoto, Japan, earthquake” by Luis Moya et al.***

### **Anonymous Referee #1**

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#### General comments:

The authors present a study that calculates the coseismic displacement of the recent Kumamoto earthquake from Lidar data and compares the results with the outcomes of alternative approaches based on strong-motion data. The manuscript is well written, scientifically sound and the topic is timely and certainly of interest for a wider group of readers in disaster risk management. I have, however, some comments and questions throughout the paper. Mainly, I suggest to improve the introduction, the discussion and conclusion chapters of the paper. For these reasons, I recommend the manuscript for publication in NHESS after minor revision.

#### Specific comments:

Introduction: I strongly suggest to add more references and a more in-depth review of

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the state-of-the-art. In particular more emphasize should be given in presenting other studies that use Lidar and/or strong-motion data to estimate coseismic displacement. Based on this and the review of work that has been done related to this particular earthquake, it would be important to highlight the need for this study and the added-value that it can bring to the scientific understanding of the earthquake. I also suggest to remove the paragraph related to a general definition of Lidar which does not add much to the content.

Page 4, line 1: I suggest to move the references to Liu et al 2011 and Lie and Yamazaki 2013 to the introduction.

Page 4, line 23: The pixel resolution would be “increased” if you resampled from 50 cm to 10 cm. A few more words on the applied convolution method would be desirable.

Page 5, line 31: “Lidar data are capable...” I suggest to move this paragraph into a separate discussion section.

Page 7, line 17-24: Suggest to move this paragraph into a separate discussion section.

Discussion: Please add a separate discussion section that clearly outlines the limitations and benefits of the applied method, and compares the results with findings of other studies (linked to studies introduced in the introduction section).

Conclusions: Some more relevant conclusions would be desirable. For example, on the basis of your study, would you be able to say if it is worth to do the expensive Lidar surveys or would the other available sensor data have been enough to estimate the coseismic displacement to a sufficient degree? On the basis of this, what are the implications of your study on a better understanding of the earthquake physics? Is Lidar just a another data source to be used or does it make a difference with respect to the other data source that have been available for this event?

#### Technical corrections:

Page 1, Line 24: Suggest to rephrase sentence to: “This Kumamoto earthquake se-

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quence triggered secondary effects such as landslides and liquefaction, and caused extensive damage to lifeline systems, buildings, bridges and transportation structures.”

Page 4, line 32: “. . .vertical axis shows is used for the number . . .” remove “is used for”.

Page 6, line 6: Add a reference to Fig. 1 to the statement that there are no Geonet stations in the area.

Page 6, line 19: Suggest to replace second “because” by “as a result of”.

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