

Interactive comment on “Incorporating multi-source remote sensing in the detection of earthquake-damaged buildings based on logistic regression modelling” by Qiang Li et al.

Anonymous Referee #2

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This is a review of “Incorporating multi-source remote sensing in the detection of earthquake-damaged buildings based on logistic regression modelling”

Overall, this is a fairly straight forward examination of remote sensing images with ground truthing of earthquake damage using logistic regression. Although much of the way there, the paper needs work to bring it up to an international level of science in terms of formatting, English, structure, referencing of other authors, and convince us this goes beyond a case study. Overall, with a major revision this should be acceptable.

Comments (not in order of importance):

• ABSTRACT. The abstract is very wordy, and lacks, until we get to the last few
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sentences, a quantitative description of the data, methods, analysis. At no point in the abstract does it talk about which years/how many images, how big an area is studied, but rather is a narrative description of the data. Please make this more of a summary of the manuscript, rather than narrative. • English. Throughout, this will need to be checked carefully by the copy editors, but overall, the English is understandable (but English as a second language). • Paragraph 1 (Introduction). Please add appropriate references (cite other people), rather than just narrative. • Introduction (background). I did not feel that you have appropriately reflected the literature of OTHERS that have done work on multi-source remote sensing for earthquake damaged buildings. I would like to suggest either in the introduction, or another section which should be named BACKGROUND (or something similar) you do a much more thorough literature review of those who have worked on examining earthquake damaged buildings based on remote sensing. Ideally, this would be a TABLE with headers that pull out information from these papers, and provides a critical review (it does not have to be at a review paper level, but enough so we have an idea of what has been done before). These headers might be “Source” (e.g., Voigt et al, 2007), Region, Earthquake, Remote Sensing Products Used, . . . , . . . , . . . , Main comments. Then, in the text of the paper, you can refer to this table, and compare and contrast. As it is, the studies you cite tend to be dated (2007, 2009, 2011, 2011, 2006, 2012, 2011, etc.) with no papers in the introduction which are since 2012. A lot has happened since then, and it does not feel that you are ‘building’ on others’ work by acknowledging them. The overall result is a Master’s thesis, and not critically done, in terms of the background. • References. Throughout, please go sentence by sentence and ensure that you have referred to the literature. If you have facts, ideas of other people, you need an in-text citation. For example, in Section 2, you do not have any references, but then state items of fact such as the Wenchuan earthquake caused a large number of casualties and damage to facilities (give a reference). Old Beichuan County resulted in relocation of the entire community (needs a reference). There are many similar sentences. You need to be VERY CLEAR where your facts and information that you cite are from. •

Section 2. Study case and Datasets. I'd like a lot more specificity about the study area and the data used. How big is the study area (Old Beichuan County) – what kind of geology is there? Is it an area heavily populated? Density? Lots of buildings? For the datasets, which years/months? How many? You are vague about the data, so a person would not be able to repeat what you did (they don't know what you used). Throughout, you need to ensure that the reader knows the (relevant background) to the study area, exactly the data you used, and then what you did with it. – Section 3. Seismic Characteristics of multi-source remote sensing images. This is fairly descriptive rather than quantitative in its presentation of the seismic characteristics one can detect using remote sensing images. There are some good parts in here, but can the section be made slightly more organized in its structure. This is evident also in having just one reference cited for the entire section – has there really been no one else who has looked at seismic characteristics using multi-source remote sensing images? – Section 4. Methodology. In terms of structure, this borders on narrative in places and could be slightly better organized in terms of “We did the following steps: (i) ****, (ii) ****, (iii) *****” with any appropriate references. In terms of content of the methodology, although parts of this are good, imagine someone who does not have your work, trying to now read it and replicate it. Have you put in enough details for that person to reproduce each step. So give this to one of your (student) colleagues NOT familiar with the work, and ask them if they could reproduce each step over an hour. – Section 5 and 6. I'd like to better understand the behaviour of your results and the uncertainty. So in practice, what would it mean if we were to use your algorithm in another region? Would we get 50% of the buildings correctly identified as damaged or not damaged? More? Yes, you give us ROC diagrams and tables of numbers, but what would this mean in practice in terms of uncertainty. This is for me the key part of the paper. You have data input, a methodology (your 'black box'), and then results – how good would those results be elsewhere and what might be limitations (e.g., if an image has clouds in it, resolution of the remote sensing image, type of land use)? A more nuanced discussion of these based on the literature of what others have done would make this into a more

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far reaching paper. – Equations. Equation 1. Infoterra is an 'interesting' source. Do you genuinely have no other sources of reference for this key equation? What is sigma standing for – you have not told us, nor why it is raised to the 0th power (I guess this is your radar sigma naught value). What is s in the k_s. Some problems for this and the other equations with formatting. Tell us the range of values here, and why DN is in absolute values. So give us some feeling for this equation, and the data going into it. Equations 3 and 4 need to have a source of their information, and the formatting looks really odd. Equation 5 and text that follows it – please check your text carefully for typos, you state “A is a constant” but Eq. (5) has not “A” it has an “a”. These are not the same. I'm not clear what X1, X2, etc., are (you state it is a feature factor). Give us an idea of some values for these, their range, what they look like. Ah, I see you do so later – but then you have to tell us you will do this later. I'd still like to better understand this variable x. – Variables. You seem to go back and forth between different font for variables, particularly x, and you do not consistently use italic. – Units. Please check all numbers have appropriate units, e.g., “at a height range of 590-600” [? m] – Equation in Section 5.2 – give this a number, and put brackets in appropriate places (1.093*BR) + (0.419*CON”. Remind us what the acronyms mean. – Conclusions. I'm not convinced whether this is a paper that really is a new method. You are somewhat vague on existing literature. I think overall it is good that you have done this methodology, just would like to see better convincing about what has been done by others. Overall, though, I think this will add incrementally to the literature. – FIGURES – For all figure captions, if you refer to 'data obtained' give us the source of the data (e.g., by authors, by ****, by *****). – Figure 6. Variables go back and forth between p and P. Figure caption needs to be more complete. The colours made no sense to me – what do these mean? Even going back to the text, I was unsure exactly what P1, P2, P3, P4 meant. The figure caption should be self standing, so a reader does not need to go back to the text, but you are vague here. – Figures 7-8. Define what you mean by ME, VA, HOM, DI, etc., in the figure caption. Why different colours. Poorly done labels in places – this is probably one of the least professional

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figures you have in the paper. You are just giving lots of acronyms without proper explanation of what they are (and one has to read the entire paper in depth to understand these. " Figure 9. Same thing, acronyms? " Figure 10. Good " Figure 13. I didn't get this (based on your caption). " Table 3. Please use the same precision throughout. (e.g., 50.00 not 50).

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-20>, 2019.