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Geoscientific Instrumentation Methods and Data Systems
Discussions

Interactive comment on "Fractal analysis of INSAR and correlation with graph-cut based image registration for coastline deformation analysis: post seismic hazard assessment of the 2011 Tohoku earthquake region" *by* P. K. Dutta and O. P. Mishra

Anonymous Referee #1

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The subject chosen is of great interest for society. Can remote sensing methods be applied to disaster assessement after earthquakes and do they show up as a change in observed fractal dimensions of the images? Unfortunately the questions are not addressed at a level where firm conclusions could be made. The presentation mixes arguments on using the method and developing and validating it. Therefore it is my judgement that the manuscript needs a major rewriting to be acceptable. As it now is I would not support publication.

General comments

The work needs to clearly distinguish between development of method and use and validation of it. Some general background papers on the topic of natural disasters like "Understanding global natural disasters and the role of earth observation", Guo (2010), could be used to set the stage. The authors do not use any "ground truth" to validate the results from the image processing in assessing damage. Similarly the image processing environment should be clearly stated, what are known before and what is our new contributions.

The language suffers from too long and complicated sentenses with unnecessary repetitions.

Details

The abstract must express the goal of the paper, the work done and the results. Unnecessary repetition of earthquake, Tohoku, tsunamis. Remove last part of last sentence "need ...".

Introduction section needs to be rewritten clearly setting the stages. The paper is not on earthquakes but on image processing methods. Make references to other remote-sensing/disaster assessment papers. How could the validation of disaster assessment be made? In general a much more stringent approach is needed. Less adjectives and more facts. As there is a chapter on methodology, why not include all image processing and segmentation details into that chapter.

The methodology chapter is a key to the paper and the first part of it is too slim and confusing and needs much more work. Still the quality slightly improves in these technical sections. There should be some mentioning on handling of errors. What are the uncertainties for estimates of e.g. fractal dimension?

The section 2.1 should modified by simplifying language. E.g. last sentence on p. 154 and first on 155 mix several "goals", tell several stories simulataneously. Last sen-

tense introduces unknown concept "alpha expansion" which is also used in conclusion section without any explanation.

Section 2.2 is the main methodology "what has been done". It suffers from a lack of stating "others have done" or "previously known" and "We have done". Graph cut methods can be computationally costly which should be commented.

Section 3 describes the main results. Segmentation techniques make a box counting estimate of fractal dimension possible. The results should be more clearly stated and the picture captions properly describe what is presented. The unsertainties need to be expressed. Last sentense on p.160 claims that maximum devastation is empirically measured. How is this validated from other sources? Similarly the end of the paragraph describes an estimate that one(!) sq km has undergone maximum devastation, which is unreasonably low value. This shows the demand for "ground truth".

Section 4, conclusions similarly are weak unsupported statements needing a validation from other sources. Fractal dimensions should be available from other sources as well and can be estimated from any picture directly, as a reference.

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 2, 149, 2012.