Author's Response:

NHESS Editors and Reviewers,

Thank you for the reviews of this manuscript and helpful comments. We have made minor revisions to the manuscript consistent with your comments and feel this has improved our revised submission. There have been no additional changes to the tables, figures, or supplement.

Below, please find our point-by-point response to reviewer comments #3 and #4. We look forward to hearing your comments on this revised manuscript.

Sincerely,

Corey Scheip and Karl Wegmann

Response to anonymous reviewer / RC3 / Referee #3

We sincerely thank the anonymous reviewer for thoughtful feedback on this manuscript. We especially appreciate these reviews considering this paper presents the first iteration of a new research tool.

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RC3 - black
Author response - blue

RC3 Comments

The manuscript describes HazMapper, a Google Earth Engine based application to visualize natural hazards based on vegetation change pre and post event. I believe this system will be very useful for preliminary analysis specially for non-scientists to get an understanding and identifying areas affected by natural hazards. Although validation and accuracy metrics are not available in present form, this tool is invaluable for situational awareness. This manuscript has already gone through first round of reviews. I only have minor comments.

Response:
Thank you for your overall assessment of this platform. We agree in this early-stage, the focus is situational awareness and look forward to advancing the platform in subsequent iterations with an eye toward quantitative assessments.

Line 10:
Authors states this tool is useful also for historical natural disasters. While true, historical events will benefit form products which can be used for scientific analysis and modeling. This iteration of Hazmapper has to rely on hand mapping within the application. Doable for a small event but highly cumbersome if needed to be done over larger areas. I think it is more suitable towards visualizing events which will occur in future.

Response:
Thank you for this comment. We have added “and visualization” to this sentence. Hand mapping is useful but can be time consuming as you point out. To alleviate this, the supplement to this paper provides an example of thresholding rdNDVI data (downloaded from HazMapper) to quickly assess for vegetation loss over large areas.

Line 55 – 60:

Justification for developing HazMapper based on level of emergency response and available resource between affluent and non-affluent regions is not correct. I urge authors to revisit this section and come up with a better motivation for developing HazMapper.

Response:
Thank you for this comment. Our motivations have not changed, but we have modified this sentence to read as:
An overarching goal of HazMapper is to leverage rapid scientific analysis and computing tools for global natural hazards awareness.

Equation 1:
Why use VIR instead of Red which is more common?

Response:
Thank for you for this comment. We have replaced “VIR” in the equation with “Red” and updated the variable definitions in the following line. From the updated manuscript:

$$NDVI = \left(\frac{NIR - Red}{NIR + Red} \right) \quad (1)$$

where NIR is the near-infrared response and Red is the visible red response.

Line 163:
How does one judge an image to be suitable?

Response:
Thank you for this comment. For these optical methods, a key assessment of image suitability is cloud-cover. We have removed the word “suitable” and simple stated “Sentinel-2 images with limited cloud cover.”

Line 290:
How is data latency for Sentinel and Landsat in GEE. Does this add to the time mentioned here? This should be discussed.

Response:
Excellent point - we have added a sentence to this effect:
Imagery is typically available on GEE within approximately 24-hours of its collection by the satellite

Line 288:

Do authors envision machine learning based HazMapper to semi automate mapping of every natural hazard described here. Visualization as it is now is not an issue but when it comes to automation, different natural hazards will require different setup. Some clarification on this will be useful.

Response:
Thank you for this comment. Our machine learning program will first focus on semi-automated landslide detection. We have added “for landslide identification” to the manuscript to clarify this.

Response to anonymous reviewer / RC4 / Referee #2

We sincerely thank the anonymous reviewer for thoughtful feedback on the revised manuscript.

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RC4 - black
Author response - blue

RC4 Comments
I thank the authors for their corrections, the paper is greatly improved, issues with the structure and style of the paper are resolved, and I defer to them on issues of terminology. However I feel my 2nd topical comment, that I don't think the website succeeds in making these techniques accessible to non expert users (i.e. democratizing them, which I understand now is the correct term and the point of the paper). This could be remedied with a basic walk through mode, for which there are a range of libraries and which can be trivially added with minimal effort (a day or two at the most). Even a simple page of text describing them, accessible from a link (as I think you are suggesting with http://hazmapper.org/learn) would do, which would be even simpler. So I recommend minor revisions to resolve this one outstanding point.

Response:
Thank you for reviewing our revised manuscript and suggesting the build-out of our http://hazmapper.org/learn portion of our website. Following your comment, we have posted text, images, and GIFs to walk a new user through our rainfall-triggered debris flow example from Kenya. We plan to continue the development of training, teaching, and outreach materials following publication. We did not make any changes to the manuscript resulting from this comment.