De Vilder and four coauthors present a quantitative risk analysis for tourists and workers to seismic and aseismic landslides on trails and roads in Franz and Fox glacier valleys in New Zealand. The methods are laid out fairly clearly and I found the manuscript an interesting read. The three discussion sections are nicely organized. I would consider it needing minor revisions. My two main suggestions for improvement are:

(1) Figures. At least one figure panel is mislabeled. Changes/additions to labeling and color ramps could improve readability and understanding. I suggest one possible figure that could be added and the addition of another panel to an existing figure. Detailed suggestions are below.

(2) References. Some cited references appear missing, notably Taig 2021a&b. I thought the landslide risk assessment introduction was generally well referenced but that there could be more background references on the range of landslides (historic+prehistoric) documented in the western Southern Alps environment (Korup, Hancox, etc.) and as far as I could tell the landslide inventory used is not specifically referenced and undoubtedly must draw from or build upon existing compilations (Korup, QMAP, etc.). I also suggest Yosemite Valley references for the discussion- they might not have the same range of events as Franz/Fox but certainly lots of parallels with rockfall risk to tourists on trails.

Line-by-line comments are below. I hope you find my suggestions helpful.

-Nicolas Barth

L 23: Since your study areas top out at 2000m and go down to 200m it might be more appropriate to point to “high relief mountain areas” rather than “high mountain areas” (most of the affected areas are closer to 200m).

L62-63: Surely you can get pre-COVID annual visitation estimates and typical daily number of workers in each valley from DOC? Similarly a peak tourist season daily count of tourists and workers? I think that would help a lot with the context.
L70: I prefer capitalization of the formal fault name “Alpine Fault” as you use elsewhere.

L74-75: A reference or two would be good here if possible. And actually the next two sentences too.

L87-88: “respectively” not needed.

L132: Just a general comment that I follow the life risk calculation approach and am fine with it. As you point out obviously a lot of unknowns that lead to orders of magnitude ranges of possibilities. I find the vulnerability factor particularly interesting. I wonder if later on in the discussion it is worth considering a 100% vulnerable scenario (i.e. approximate scenario that a trail closes because a large landslide is witnessed, near miss, or someone is struck by a rock but fine)- potentially important from an economic standpoint.

L540: Taig 2021 (a&b?) is cited multiple times as a seemingly important reference but does not occur in the reference list.

L560-567: Not required if you think it breaks your narrative but there are several good references to rockfall risk in Yosemite Valley (4M visitors/yr) including their extensive rockfall database that visitor are encouraged to submit observations to (crowdsourced). A QR code to report a rockfall/etc could be placed on the signage suggested at L546.

https://www.nps.gov/yose/learn/nature/rockfall.htm

https://pubs.usgs.gov/ds/746/

I agree with you that better documentation of events will go the furthest for robust decision making.

The appendix was skimmed but appears to be appropriate.

To better acquaint your readers with the types of hazards and potential exposure, it might be helpful to have a multi-panel figure showing photographs (aerial and ground) of different hazards (rockfall, debris flow, rock avalanche, etc) and the style of infrastructure (trails, roads, etc.) within the valleys. I would suggest this could be a good Figure 2 (sliding current Figure 2 to the 3 spot). And relatedly some text in the Study Site section.

Figure 1: Nice figure overall. Some of the details are hard to see because of the resolution and jpg compression- I suggest the final version have a higher resolution. Maybe shade the glaciers in transparent blue polygons to improve context? Show Alpine Fault in Panel B? Maybe label bridge locations at outlets of the study areas? Clipped study area boundaries are a little arbitrary, especially Fox case study that crops the unnamed west-draining creek off Pt 1401, Serac Creek, and unnamed west draining creek from Mt Garnier (but whatever I guess).

Figure 2: Maybe add the PGA labels to the “Band 2”/etc in the legend so the figure stands alone better.

Figure 3: Slope angle legend is wrong in panel B (flipped). Specify how the local slope relief in panel C was created (typically a radius of a chosen width?). Provide citation for data in panel A and panel D. What is the source and basis of the vegetation mapping in panel E? The bedrock ridge of Cone Rock (high probability in panel F) should be vegetated.

Figure 5&6: Pretty much same comments for both figures. The color ramp in panel A is so
smooth (17 shades of blue) such that visually you can probably only determine color values to +/-1-2. It looks nice but a more variable color ramp would convey more information. In panel C it is hard to differentiate a lot of the colors chosen, particularly 10m3 and 10000m3. In panel D again I think helpful to have PGA ranges in legend.

Figure 7: Is it worth scaling the two panels to the same LPR scale? Maybe some loss of detail but would help in comparing the two valley tracks directly.

Figure 8: Nice. Maybe mark the track positions on the different images? Was the Chalet Lookout Track marked on the LINZ topo abandoned due to this landslide?- dot that in to further illustrate the point?

Figure 9: Suggest a more variable color ramp again. Just a comment that it is interesting to see the SE of Cone Rock spillover in the LPR- a nice argument for the value of high res topo data in these analyses.

Figure 10: I found this a really useful figure to help contextualize the results of your study, particularly in a way readers and policy makers can understand. While the per trip metric is helpful for evaluating tourist’s risks, it is less helpful for evaluating the risk of workers who have prolonged and multiple exposures. It would be helpful to be able to evaluate the risk of workers in the valley (trail maintenance, road worker, tour guide, etc.) compared to other places in New Zealand alongside this “one visit” risk. Presumably someone doing trail maintenance will linger in the more dangerous areas longer. Seems like you may have a lot of these data in Massey et al. 2018c? Wishful thinking perhaps but it would make a nice second panel to this figure.

END