

## ***Interactive comment on “Brief Communication: Vehicles for development or disaster? The new Silk Route, landslides and geopolitics in Nepal” by Karen Sudmeier-Rieux et al.***

### **Anonymous Referee #1**

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#### General Comments:

This brief communication discusses rural road construction in Nepal and the effect on landslide occurrence, with a wider overview pertaining to the geopolitics of this complex region, particularly the role of China. Such a topic is important and deserves discussion however, effectively addressing the many varied and complex issues in such a short manuscript is difficult, and to my view, this manuscript does not do a sufficient job of addressing the issues at hand. This manuscript falls down at the very outset with the list of questions presented at the end of the introduction. The importance of the questions posed is in no doubt, however to address each sufficiently requires far

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more than a brief communication, and certainly not one with a sole focus on road-induced landslides. The authors appear stuck between writing an historic summary of road building policy and its effects and providing an over-arching discussion about the difficult geopolitics of the region. Certainly, there is no novel scientific contribution provided; the links between rural road construction and landslides has been discussed and demonstrated by many authors previously, some of which the authors reference. Thus, the manuscript could be significantly improved by refocussing the paper and being clear from the outset what is the novel contribution being made.

A further issue is the oversimplification throughout the paper. This comes about partly through the desire to reduce length and maintain a 'brief communication' - however the topic is not one that gives itself to a short discussion. For instance, do the authors really feel that the appropriate way to address questions such as "who will win and lose" between two superpowers (line 36-37), and "will Nepal rise to the challenge of establishing safeguards to ensure promised benefits outweigh losses as it transitions to the newly established federal system?" (line 40-42) is simply by discussing well established links between road construction and landslides and not the myriad of other issues involved? Is a better question, and one significantly easier to answer and arguably more directly relevant - will the increased landsliding resulting from these roads outweigh the benefits they bring? I would urge the authors to consider what is they really wish to address and discuss in this manuscript and focus on that. Trying to deal with such large-scale geopolitical questions is to be commended, but to do so sufficiently cannot be from such a narrow and specific view point.

#### Specific comments:

Abstract: This reads more like an introductory statement than an abstract, and points to the fact the manuscript has little new scientific results to present. In fact, it is exactly duplicated from the first paragraph of the Introduction, for which it is better suited.

Line 30: recent landslide victory - confusing to use landslide in this context when the

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rest of the paper focusses on the physical phenomena

Line 36-42: None of these questions are actually addressed in the paper - probably because its not really possible to do so from such a narrow view point

Line 42: based on research - your own or others?

Line 50: road construction has been closely linked to nation-building - but this is just one of many factors, right?

Line 56-58 - Not clear what this has to do with road construction?

Line 63-65 - One of the many simplifications in this manuscript - the signing of the new constitution and the subsequent blockade spun out of many varied and complex internal and external factors. You mention the complex factors of Indian discontent and ethnic sympathies, but ignore the internal politics in India that were also leveraged by the blockade.

Line 67-68 - Again, China's relationship with Nepal is complex and to suggest it is good due to the response to the earthquake is to over simplify the issue. China repeatedly clashed with Nepal and India during the response over air space and Indian military close to the border. At one stage China threatened to pull out unless India and Nepal played by its rules. Nepal siding with China was another causative reason for the subsequent Indian blockade. These few lines here just emphasise the over reach of this manuscript - these issues themselves require much more discussion and do not just come down to road building and landslides.

Line 79-81 - but this infrastructure is also badly needed. Connecting isolated communities enables socio-economic development that can greatly increase development for isolated rural populations.

Line 83 - proper engineering standards - debatable, many of these roads are constructed to the standards of the host country, which are often grossly insufficient. Sections of the Arniko are a perfect example.

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Line 83-87 - this is certainly an issue, but also ignores a further issue that was seen in the 2015 earthquake. These main roads become economic belts which drive migration to form new road-side settlements (e.g. Chaku on the Arniko). These roads are typically built in valley bottoms to make construction easier meaning that populations migrate from what were previously reasonably landslide-safe locations down into valley bottoms where their exposure to landslides dramatically increases. Many of the fatalities in 2015 in Sindhupalchowk occurred amongst new road-side communities. So while this road construction undoubtedly increases hazard it also increases population exposure.

Line 91-93 - do you have a reference to support this?

Line 95 - in the middle and lower hills - but above you mention that road construction is increasing mainly in the high and mountain areas. This would suggest the increased landsliding in the Siwaliks is related to stronger monsoons and not road construction?

Line 126-127 - precisely, what will the consequences be for Nepal? You do not directly answer this question anywhere.

Line 151 - this isn't the sole reason referred to by Petley et al 2007 - they also highlight that land use changes (i.e. urbanisation) and the now-ended Civil War as being other key contributors.

Line 158 - "associated with a road" - what does this mean exactly? Did the road cause the landslide, or is it just that a landslide occurred near a road? Defining what you mean by 'associated with' is important.

Line 165 - "ridge shaking effect" - I'm not sure there is enough evidence to conclusive determine why coseismic landslides are different to rainfall landslides just yet. Many papers point to numerous different factors involved in coseismic landsliding, with the ridge effect being just one. For instance see:

Yamagishi, H., & Iwahashi, J. (2007). Comparison between the two triggered landslides

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in Mid-Niigata, Japan by July 13 heavy rainfall and October 23 intensive earthquakes in 2004. *Landslides*, 4(4), 389-397.

Chang, K. T., Chiang, S. H., & Hsu, M. L. (2007). Modeling typhoon-and earthquake-induced landslides in a mountainous watershed using logistic regression. *Geomorphology*, 89(3-4), 335-347.

Van Westen, C. J., Van Asch, T. W., & Soeters, R. (2006). Landslide hazard and risk zonation—why is it still so difficult?. *Bulletin of Engineering geology and the Environment*, 65(2), 167-184.

Line 176 - "after 12 years" - that seems an awfully long time for a rural population struggling for access and the associated economic benefits right now.

Line 190 & 194 - repetition

Line 192 - typo, 20th

Figure 1 - I'm not sure what the isoseismals in the inset are supposed to add, especially since the earthquake is only mentioned once in the text. In any case, they are difficult to distinguish with the present colour scheme. Likewise for rainfall, I'm not sure what this adds given there is no specific discussion of varying rainfall amounts over Nepal. Would it not be better to show the population distribution to make clear the number and importantly location of people surrounding these roads?

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