

Interactive comment on “Ground-penetrating radar observations for estimating the vertical displacement of rotational landslides” by C. Lissak et al.

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General comments: The manuscript "Ground-Penetrating Radar observations for estimating the vertical displacement of rotational landslides" addresses an interesting application of GPR in landslide research. The authors show nice examples for pseudosections crossing landslide damage on a road in France. The idea of the paper is innovative to use defined reflectors from old road pavement structures as markers to monitor and estimate subsidence rates close to the head of a landslide with noninvasive methods. The authors try to reconstruct the subsidence as a indicator for activity of the landslide using the GPR data and further data from absolute position monitoring.

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Specific comments: As mentioned it is a nice potential application of GPR in landslide monitoring. For me the authors should address some aspects, which are for me not clear from the current version of the manuscript:

- First the authors set up a nice hypothesis about genesis of reflectors and how this reflectors may be used as indicators of subsidence. Nevertheless, from the presented data there is no prove that the reflectors are in accordance to this hypothesis. E.g. no drillings have been presented. Furthermore no data about road reconstruction are presented. There is just an assumption that after the acceleration events there must have been a major road reconstruction. Is this true? From the presented subsidence rates even more reconstruction are necessary to keep the roads safe. Maybe the subsidence history for the different road reconstructions and comparison with the GPR data might be a first hint, although, it might be difficult as compaction and young's module usually change by depth.
- All profiles presented are oblique to the main displacement direction. This might be an advantage but can be also a disadvantage especially in case of inclined strata and relevant vertical displacement. Even so the authors describe the position of the profiles close to the head scarp, over 30 years there might be also relevant lateral displacement. It would be nice if the authors could discuss this point short.
- The Chant des Oiseaux Landslide is not very well connected to the story of the manuscript. Only data are presented without detailed discussion either regarding the subsidence history (of which you know little) or in comparison to the data from the Cirque des Graves landslide. Therefore, I suggest either omitting it from the manuscript or discussing it more in detail with respect to the topic of the manuscript.

Altogether it is a interesting topic, written nicely but I miss a comprehensible prove of the concept described. Just to be clear, I see no problem with the used technologies, but the interpretation needs for me more supporting data.

You might find further comments in the attached manuscript.

Kind regards

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Please also note the supplement to this comment:
<http://www.nat-hazards-earth-syst-sci-discuss.net/2/C3299/2015/nhessd-2-C3299-2015-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 7487, 2014.

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