

## ***Interactive comment on “Characteristics and frequency of large submarine landslides at the western tip of the Gulf of Corinth” by Arnaud Beckers et al.***

### **Anonymous Referee #1**

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The paper presents the interpretation of landslide deposits from different sets of single-channel seismic reflection profiles across the Gulf of Corinth. From a hazard perspective, evidence of mass transport complexes is important, particularly if these can be linked to the preconditioning and triggering factors. In this area, recurrence rate of landslides appears significant, and as landslides can generate destructive tsunamis, assessing the source areas, causes and consequences are important. This is a well-written paper, with a good data set and logical structure, even though the content is largely descriptive. There are nevertheless a few points that I am missing from the paper: Whereas identifying landslide deposits and obtaining the volumes involved are essential in a geohazard perspective, there is also a need to better define the land-

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slide processes and consequences. - I am somewhat surprised to see that the source areas from the different landslide events remain very poorly constrained, despite the fact that some of the landslide deposits are quite large, and cover a significant part of the basin. - The preconditioning and triggering factors remain uncertain. I note that the point (abstract) of dramatic changes in water depth and water circulation at 10-12 ka is only applicable to a some of the cases. - Landslide dynamics and the tsunami potential are briefly mentioned but not really addressed. Such assessment would require modelling, but also information about the soil properties, the source areas, etc. Not all landslides will create tsunamis (see Løvholt et al., 2017). - The authors report landslide volumes, calculated from a (sparse) grid of seismic reflection profiles. The authors should mention the method used to obtain these values (e.g., gridding algorithm) as well as adding a statement about the uncertainty, particularly considering the line spacing of the seismic lines, and the lack of 3D seismic data. Can we be sure that the spatial extent mapped is a realistic impression of the failures or can they be over-estimated, due to the gridding and missing out areas where there are no deposits (but not evidenced because of the lack of data). This should be added as a key point under 5.1 Limitations of the analysis. - What is the onshore-offshore relationship of the landslides? - In the interpretation, the authors repeatedly refer to blanking but they do not really illustrate what is it and what the causes may be. - Likewise, the authors refer to coarser grained material in a deformed mass transport deposit, but there is no evidence for this. I doubt that one would be able to observe this from sparker data, as the masses are essentially deformed. Maybe speculation?

Smaller comments: - I would recommend making the seismic profiles with the same vertical exaggerations or same scales to facilitate comparison. Likewise, please add an indication on the figures where the seismic lines cross. - Terminology is in places confusing. I understand from this paper that landslide event actually refers to a certain interval in time (not specified) during which various landslides (with different source locations) may occur. Thus, different landslides compose a landslide event. - The map should contain all geographical references used in the text. This is currently not the

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case. - On Figure 1, I would recommend adding a colour-coded (shaded relief or so) topographic/bathymetry map and slope map, as both are important to understand the processes. The maps should ideally cover the onshore and offshore part. Note that the "grey lines" referred to are not only the seismic grid but also bathymetric contour lines. Add the location of the Delphic Plateau, and the "Canyon". - There are a few typos in the text - Figure 2: explain the horizons [1] and [2] - The term "outcrop" suggests that something was eroded on top. This may not be the case for the youngest landslide deposits. Consider using exposed as the seafloor - Figure 6 is too small, and ideally, the maps should all use the same area, to facilitate comparison. This would be a good place to add the various source areas.

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