

Interactive comment on “Erosion after an extreme storm event in an arid fluvial system of the southern Atacama Desert: an assessment of magnitude, return time, and conditioning factors of erosion caused by debris flows” by G. Aguilar et al.

G. Aguilar et al.

german.aguilar@amtc.cl

Received and published: 7 October 2019

Dear Martin Mergili,

We would like to thank you for taking the time to review our manuscript. We highly appreciate his suggestions and comments, which are helpful in improving the manuscript. We are going to include all the suggested modifications, particularly improve the quality of the English. We would like to answer two significant comments to clarify and maybe

C1

start a discussion:

P3, L4f: How do you know about the different rheologies? Analysis of deposits, interviews with witnesses, ...?

[Reply] Rheologies was inferred by the analysis of deposits after March 2015 storm including sedimentology and geomorphological patterns in selected alluvial fans. This characterization are in the PhD Thesis of A. Cabré and in the manuscript entitled "Tributary-junction alluvial fan response to an ENSO rainfall event at El Huasco river watershed, northern Chile." which we submitted to Progress in Physical Geography (Cabré et al., submitted PPG).

P5, L11f: If no debris flows were reported, does it really mean that no sediment was delivered to the trunk valley? Even though you use a rather broad definition of debris flow, there might still be some fluvial sediment transport.

[Reply] Yes, effectively. Sure that sediment was delivered from all tributary affected by the storm, but only debris flows where deposited in the tributary-junction of 49 catchments. For these reason, we consider the volumes measured like a minimum of transference of sediment to the trunk valley (see line 15-21, page 10).

P10, L27f: But how does the sediment get into the channels? On long (geological) time scales, hillslope processes probably play a role?

[Reply] Very good question. Although it is not the subject of this specific work, we can advance that the filling of the canals develops rapidly in some years after the storm based on observations made in a subsequent storm occurred in May 2017. So, it is not necessary so much time, since the slopes have enough sediment to fill the canals in a short time, in particular from sediment stored in the "flat" slopes of the head of the catchments, mainly from upstream the knickpoints. But, we think that this is another manuscript that need more data (TCN and provenance studies).

Best regards

C2

German Aguilar

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-239>, 2019.