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Interactive comment on "Combined effects of grain size, flow volume and channel width on geophysical flow mobility: 3-D discrete element modeling of dry and dense flows of angular rock fragments" *by* Bruno Cagnoli and Antonio Piersanti

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We would like to thank Ylona van Dinther for her comments and we would like to congratulate her on the birth of her new baby and wish her all the best.

(1) COMMENT Based on an initial scan of the manuscript I noted distinct similarity and repetitions of results obtained in your 2015 JGR paper. Grain size and flow volume were already studied in detail there, so I do not see the point to repeat too large quan-

tities from that study. Besides large quantities of text (19% of the text resembles your 2015 study according to the similarity report), I also see several figures and tables are exactly the same (e.g., Fig. 1, 2 and 4) while all other figures are also very similar to your JGR 2015 paper. In my opinion such large amount of overlap is surely not warranted in scientific publications.

(1) ANSWER > The submitted paper illustrates numerical simulations carried out by using channels with six different cross sections (Fig. 3). The cross section did not vary in our older paper where we used only one cross section. Running numerical simulations with six different chutes is a significant amount of new and original work in term of design and time. For this reason our new study is a significant and important addition to the scientific literature. The novel and important results of our paper that the reader (and the reviewers) should focus on are summarized by Figs 9, 10 and 12. These figures justify the publication of the paper. The other figures have the purpose to illustrate the system we are studying and, for this reason, they are necessary because, otherwise, the reader would not understand which system our results apply to.

> Here repetitions are of two types: a) concerning the method and b) concerning some of the conclusions. Both are unavoidable and their removal would significantly damage the paper by making it poorer and more difficult to understand. In scientific paper clarity is of paramount importance. The reader does not have time to go back and browse a previous publication where information that is still of key importance here was first introduced. These two types of repetitions are unavoidable for the following reasons.

> Methodological Repetitions. These repetitions are due to the fact that we are using the same materials and geometries of particles and chutes (section 2.1 and Tables 2 and 3 and Figs 1, 2 and 4) and the same numerical modelling (section 2.2) that we have used in our older publication. Both paragraphs and figures have been modified as much as possible where needed. It is however obviously a mistake to remove this information because the reader would not be able to characterize the system we are investigating. This applies also to the other figures in the new paper that show images

of the actual granular flows in motion: they are needed to show which type of granular flows we are talking about.

> Repetitions of Some of the Conclusions. The key concept to understand here is that the effects of channel width, grain size and flow volume are the two (well ... three) sides of the same coin because they interfere with one another. In other words, they must be studied together as demonstrated by the fact that they occur within the same scaling parameter. For example we can ask ourselves what happens to the grain size effect in channels with different widths. Does it change? The same applies to the volume effect. Here we show that these effects are still valid no matter the channel width. For this reason it is not possible to delete the discussion of the grain size effect and the volume effect from the new paper. Importantly, this discussion has also been enriched by our answers to the good comments by reviewer Ming Zhang. The improved version of the paper has been attached to the answers we have provided for Ming Zhang.

> As a general comment we can say that confirmation of previous results is a rare occurrence nowadays but it is of fundamental importance for a healthy science as demonstrated by an inquiry conducted by The Economist where they show that it has been impossible to reproduce most of the scientific findings published recently by academic journals. This is the problem that scientific journals should start tackling very seriously. Everybody who is interested in the future of science should read the article (Unreliable research: Trouble at the lab, Oct 19th 2013, The Economist).

> Concerning the similarity report, we do not know whether this has been obtained by blindly running a computer software, we do however know that the only way to evaluate a paper is by having it read by a human (possibly an informed one).

(2) COMMENT Additionally, it seems that in your new scaling parameter you only replace the length scale in the denominator from width*width to width*length. Is this correct? If so, I would acknowledge that within the paper and tune down the formulation. I would say it is a small update of a scaling parameter.

(2) ANSWER > A change of a quantity in a scaling parameter is not a trivial matter because it affects whether or not it is possible to use this parameter to solve practical problems. Here we show that the channel width that occurs at the denominator of the scaling parameter has an exponent equal to 1 instead of 2. This means that another quantity with the dimension of a length has to be introduced at the denominator of this parameter for it to be dimensionless. We proved here that this quantity is either the length of the flow or that of the deposit.

> We do explain the history of the parameter in section 5.3. This change in the scaling parameter is the result of a long study (more than one year of computer processing time) of the effect of the channel width on flow mobility. As we explain in section 5.3, although in our earlier paper we could guess that the channel width occurs at the denominator of the scaling parameter that the reciprocal of mobility is proportional to, a specific set of investigations where the value of the channel width varies systematically is necessary to figure out its exponent. The paper submitted to SE illustrates this systematic set of investigations.

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