

Interactive comment on “Impact of snow gliding on soil redistribution for a sub-alpine area in Switzerland” by K. Meusburger et al.

Anonymous Referee #3

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The comparison of erosivity caused by liquid-driven processes (rainfall, snow melt) and snow movement erosivity is a thrilling task and in my opinion any quantitative research in this topic is of value. As mentioned by the other referees the weaknesses and uncertainties of the methodology should claim more attention in the presented manuscript. I assent to the view of referee #2 “if after thorough error analysis of the data the results still hold, the authors should be invited to resubmit a manuscript”.

Main comments:

1. The description and the presented results of the experimental sites is somewhat confusing and inconsistent. 15 sites are mentioned in fig.1, only 14 in the text. The missing alder stands in fig.3 should be explained in the text and not just in fig.1. Table

C5050

1 should additionally contain modelled sgd. Table 2 should contain all measured site characteristics.

2. In addition to the described uncertainty by the previous referees, further not replicable inconsistencies are to find. E.g. the lowest value computable with the given equations 2 or 3, considering a FVC of 100%, gives a C-factor of 0.0047. Table 2 gives minimum C-factors of 0.003. Applying higher C-factors for h2N, A1N and A3N almost doubles the resulting RUSLE rate.

μs within the SSGM shows a values range 0.02 to 0.07, whereas the original SSGM description has a range from 0.22 to 1.18. This should be explained more in detail. Besides, no explicit information is provided as to SSGM calibration, especially concerning north slopes, which were not present in the original work.

A possible explanation for discrepancies at *Alnus viridis* sites is given by different 137CS interception. For me it seems more likely that a high FVC value leads to low RUSLE rates, while a weak vegetation cover beneath alder could increase soil erosion significantly.

SSGM calculates the highest sgd values for alder sites. As *Alnus viridis* is a tree, alder sites could be seen as forest stands. This would end in substantial lower snow glide distances, as measured (alder sites are not represented in the original SSGM-study).

Minor comments: P9509L25 *Globularia cordifolia* P9511L23 units of erodibility factor K differ from table 2; also P9515L15 P9514L17 varied from 2 to 189 cm

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C5051