Review to „Denudation systematics inferred from in situ cosmogenic ^{10}Be concentrations in fine (50–100 µm) and medium (100–250 µm) sediments of the Var River basin, southern French Alps“ by Mariotti et al.

General comments

This is a very appealing, well-written paper supported by nice figures that looks at differences in in situ 10Be concentrations with grain sizes, specifically between the very fine sand and fine sand fraction. For in situ cosmogenic nuclide applications to marine archives that have so far largely been avoided as very fine sand is often the only fraction that is available, this paper now demonstrates that such archives will be much better accessible in the future. I therefore welcome its publication with only minor comments.

The authors present this work in a clear way that I find very logical, and it´s obvious that the authors spend a lot of time and thought on this. They have made a time series analysis, investigated sediment mixing, and they have included all necessary comparisons with other datasets from the Alps. The two things that I can identify what are missing are 1) a discussion or statement of why the fine grain size fraction should, in a geomorphological sense, even have a different nuclide concentrations. I mean, what controls nuclide concentrations in different grain sizes in the first place? Abundance of landslides, transfer time…? In line 24, p. 3, you have mentioned landslides, but this is in my view a bit too general. In Fig. 5 as another example, you plot the data against slope, MAT, etc, but it´s not so clear for me how these parameters precisely control 10Be conc. in different grains sizes. The presentation on the discharge variability in the two different sampling years touches a bit on this. Overall, with regard to this, it would be nice to acknowledge the work on TCN in grain sizes by Renee van Dongen from our group (ESurf, 2019). May be you have overlooked it (it should be published. If not, I will check and send you the paper). 2) In section 3.2, it would be nice to more specifically address is the fine grained samples were treated in a specific way (regarding mineral separation, I mean). Perhaps this was not done? If etching and final meteoric leach-off were done in a standard way for both grain sizes, then say so.

Specific comments:

Swop 3.1 with section 3.2. One usually starts with the samples and their measurement.

Line 17. p. 7: This sentence about nested catchments is a bit out of place. Move to 4.3

Line 23, p.8: Is frost cracking preferably producing finer grain sizes? If yes, please clearly say so. See my general comment above.

Section 4.2: I assume that these mean values of e.g. slope you discuss here have been calculated for the entire basin or subbasins. However, for the sake of comparison with denudation rates, and deciphering the controls on grain size, it

would be better to calculate the slope of the areas only containing quartz, as only these, and not the entire basin, supply the quartz and hence “see” the denudation rates and react to slope or elevation.

Conclusion, first sentence: Please change the word “modern” to “millennial” or “cosmogenic-derived”. “Modern denudation” is usually used with regard to erosion rates from sediment gauging. If called so in the MS throughout, please change there, too. Haven’t checked.

Line 9, p. 10: Change “previous” studies to “published”

Figures and Tables:

Table 1: Please give two significant decimals for each denudation rate number and error (i.e. for the error on Denudation rates, sometimes there is only 1 significant decimal, like 0.03. Please change to e.g. “0.031”). In contrast, the integration time is probably given too precisely (see Table 2, where this is fine).

Please include total basin area, too.

Fig. 2: The overall look / behavior of the data reminds me of the Po basin data. There is also higher variability upstream, but then downstream the variability decreases. Even though there is not a large floodplain, it may be worthwhile to discuss this behavior a bit.

Fig. 4: Wouldn´t it make more sense to color code by “min” grain size instead of “max” grain size (I mean the published data?) I would think that the comparison to the smallest grain size is most interesting. Or is this always 125 um?

This is a very long caption. You might want to shorten it.

Fig. 6: Write “calculated” on the x-axis instead of “cal”. You have the space and it is otherwise a bit odd (used in C14 dating).

Best regards,

23.8.2019 Hella Wittmann