

Reply to referee J. Laronne (#2)

We thank Jonathan Laronne for his constructive and interesting comments. Below we give detailed replies and outline the changes made to the manuscript.

General comments

4182, line 2: *Is the term 'bedload erosion' to be used? Best use bedload as a process that transmits sedimentary particles from sources (river banks, slides and debris flows) and at times from the stream bed (e.g., mobilized bars) downstream, generating and leaving behind what is often a long term equilibrium channel profile. The authors are obviously aware of this terminology, so suggesting to rephrase.*

We agree that the term “bedload erosion” is inaccurate here. We rephrased the beginning of the abstract as follows: “In Alpine regions, floods are often associated with erosion, transport and deposition of coarse sediment along the streams. These processes are related to bedload transport and pose hazard in addition to the elevated water discharge.”

Moreover, as also suggested by reviewer no. 3 (F. Comiti) in his technical corrections, we removed the term “bedload erosion” throughout the text (mostly replacing it with the term “sediment erosion”).

4183, lines 5-9: *Suggest rephrasing because overbank deposition is a 'normal' process leading to the enrichment of floodplains with sediment and nutrients. The damage caused by overbank deposition occurs when settlements or individual homes and roads are located too close to riverbanks. Farmland may be affected by overbank deposition, though on the long run this process is not only natural but beneficial.*

We see the reviewer’s point and slightly rephrased by deleting “in the worst case”.

4183, lines 24-27: *Relevantly, it serves to be additional to the European Flood Directive in delimiting areas of activity in the vicinity of rivers and river banks. This is particularly relevant when zoning and planning are concerned.*

We have added a sentence to the text according to the reviewer’s suggestion.

4186, line 23: *Although this is a recent contribution and as such welcome, surely the authors are ware of considerable antecedent contributions demonstrating this principle*

We agree and added the contribution of Bathurst et al. (1987) to the text.

4187, lines 25-28: *This makes sense, however the reader of this journal may not be sufficiently aware of bedload processes. Here or better in the introduction with a similar posted comment, it is very worthy to stress that bedload fluxes may be very high without undue damage, as long as the relevant fluvial landform remains unchanged. I.e., as long as the quantity of bedload entering is equal to that exiting. Interesting but likely too fluvial geomorphological for this journal, there are instances when sediment (also bedload) discharge is very high, there is average balance in input and output, but some parts of a reach are eroded and others undergo deposition.*

We agree and added a sentence to stress the reviewer’s point in the first paragraph of the introduction.

4202, lines 25-26: *Here the authors over-emphasize bedload prediction per se, instead of gearing it to be useful for construction, zoning, planning. This is particularly relevant to the readers of this journal.*

We deleted the sentence “Substantial losses will only be avoided if bedload volumes are predicted with reasonable accuracy” and slightly altered the two preceding sentences, trying to stress the usefulness of bedload prediction for mapping (incl. zoning), construction and planning.

4203, line 9: *This and other publications of Recking are both worthy and relevant, but ‘satisfactory’ is ostensibly not the appropriate term for any equation that has an error of half a magnitude in both directions. Consider deleting reference to a ‘reliable’ estimate.*

We agree. In a first step we replaced the terms “satisfactory” and “reliable” and added a sentence that points to the considerable margin of error associated to the method of Recking (2010). Then, in a second step (following the advice of referee no. 3), we deleted the entire paragraph describing the approaches and only left the references to Recking (2010) and Nitsche et al. (2011) at the end of the previous paragraph.