

Interactive comment on “Measurement of spatial and temporal fine sediment dynamics in a small river” by Y. Schindler Wildhaber et al.

Anonymous Referee #1

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General comments

This paper reports the results of comprehensive sediment sampling campaigns conducted in a small river located within the Swiss Plateau. The instrumentation and methods used for sampling suspended sediment, infiltration, and bed load are soundly presented, compared and evaluated. The bibliographic review, the scientific objectives and the statistical analyses of the results are clearly, thoroughly and precisely stated.

In my opinion, the interpretation of the results is the weakest part of the study. Indeed, despite comprehensive statistical analysis of the data is performed, spatial and temporal trends in the measurements cannot be explained clearly, since instrumental and sampling errors cannot be distinguished from the spatial and temporal heterogeneity

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of the sediment processes. In their conclusions, the Authors are often not able to decide and honestly express this. Clearly, this impressive experimental study calls for i) laboratory tests to assess the instrumental biases in controlled hydraulic and sedimentary conditions; ii) more advanced studies of the hydrological processes at the catchment scale and of the hydraulic processes at the local reach scale.

However, I think that this experimental field study is scientifically sounded and of sufficient interest to the community for being published with some moderate revisions.

Specific comments

Overwhelming statistical analyses could be reduced by eliminating some developments that do not bring real advances in the understanding of sediment processes and instrumental biases.

p.11325: why don't you study the influence of grain size changes on your turbidity measurements? Was the grain size of SS samples used for the turbidity-meter calibration measured?

section 3.4: here typically, some study of the local hydraulic conditions (bed shear stress) would help interpret the spatial patterns of the bedload results. Some illustration of the site layout, flow patterns and disposal of the separate bedload samplers at each site would be helpful.

section 3.5.2 and section 3.5.3: brave statistical analysis and empirical fits do not bring real answers to the questions raised about the possible bias of sediment infiltration baskets, bedload traps, and accumulation baskets... That the infiltration rate is almost twice of the trapped bedload remains without explanation to me. Could you draw some perspectives of further studies in order to solve the point experimentally?

The number of tables could be considered too high for a research paper. In an additional figure, some pictures or technical designs of the instruments, especially baskets, integrative SS samplers and bedload traps would be helpful and informative to the

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reader.

Fig.2. It is not clear to me how the 95% confidence intervals were established. Could you assess the uncertainty in the SSC samples? as well as the uncertainty in the SSC derived from the calibrated NTU measurements? Usually, the calibration curve is forced to (0,0) since turbidity should be proportional to SSC.

Technical corrections

page 11318, line 17: dynamics

11320, 7: mean instead of median?

11323, 8: clay <63 μ m (2 μ m?)

11330, 11: exponentially

11332, 22: quite

11332, 7: Table 9 not available

11335, 2: dynamics

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 11315, 2011.