

## ***Interactive comment on “Seasonal logging, process response, and geomorphic work” by C. H. Mohr et al.***

**Anonymous Referee #1**

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### General Comments

This manuscript uses a Quantile Regression Forests statistical tool to model sediment concentrations and yields from logged watersheds in Chile. The authors find that the QRF model outperforms the more traditional sediment rating curve approach to modeling sediment yields, in that sedigraphs predicted by the QRF model more closely agree with measured values than sedigraphs predicted by the rating curve approach. Given the promise shown by the QRF method, this work will likely garner the interest of scientists and land managers that are engaged in the prediction of sediment yields from a wide range of landscapes. Overall, I think this is interesting work that appears to be methodologically sound, but I do have several general comments/questions:

The rating curve method uses only one variable (discharge) to predict sediment con-

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centrations. In contrast, there are 21 variables in the QRF model and it would be useful to know if pared-down versions of the model perform as well as the full model, with respect to the predictions from the rating curve method. In other words, with only discharge data as an input, does the model still outperform the rating curve method?

Comparison of modeled and measured annual sediment fluxes are presented in Supplementary Table 3, but little of the manuscript text is devoted to discussing the differences. It would be beneficial for the authors to more fully explore/explain these results and to explain (if possible) the underlying differences between the modeled and measured values.

There should be more information about the timing of logging and post-logging treatments, as the introduction seems to make the case for a need to assess the impact of clear-cutting, but the discussion indicates that decreased suspended sediment yields following dry season logging may be due to replanting.

The implications of this study for geomorphic work do not seem to be as clear as those presented in the manuscript. The highest discharges measured during the study may be extreme with respect to the other values in the dataset, but a longer-term record is not presented (for either discharge or precipitation) that demonstrates that the discharges are extreme with respect to annual exceedence probabilities. More context is needed to demonstrate that these findings differ in a substantial way from, for example, the view put forth by Wolman and Miller (1960).

### Specific comments

Page 313

Lines 1-2: Avoid leading off the manuscript by bringing up a discussion about man-made forests, especially because this topic is not addressed again in the paper.

Line 8: I don't believe the road-related landslides documented by Montgomery et al., were triggered by the failure of road cuts, but the change in upstream drainage area

caused by the construction of the roads.

Lines 20-25: It is unclear why re-planting specifically, requires a technique capable of dealing with few samples collected under varying conditions. Put another way, the tools introduced in this paper can likely be put to a much broader use than for assessing sediment yields from re-planted clearcuts in Chile, as a small number of samples, high variance, and changing environmental conditions are inherent to a broader range of scenarios where sediment yields need to be quantified. It would be worthwhile to present a broader utility of the techniques developed as part of this study.

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Line 7: SSC measurement were not made every three minutes, but every 30-60 minutes, which was not the impression one gets from reading lines 10-11 of the Abstract, which states sediment concentrations were measured every three minutes. I'd encourage you to report the data that were collected in an un-ambiguous manner.

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Lines 11-12: As presented, it is unclear why the bulk sediment flux measurements are minimum values.

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I'm not convinced that the sediment transport events that were measured are extreme. These data are not put into the context of a longer record, but the recurrence intervals seem to be < 1 yr. More context is needed to demonstrate that these results differ in a substantial way from the view put forth by Wolman and Miller (1960). Supplementary Table 3

The results presented in Supplementary Table 3 contain information that most readers will want to know: how do total sediment yields predicted by the QRF model compare to those predicted by the sediment rating curve method, and how do both model predictions compare with measured data. These data need to be more fully integrated with

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the main text of the manuscript. Currently, the only table in the manuscript presents the number of samples, whereas the comparison of the model predictions are much more important.

Editorial comments

Page 313

Line 10: I suggest revising this sentence, as it is not clear what is meant by "the long-term decay of soil conservation functions".

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Line 18: Suggest changing "gauges" to "weirs".

Line 22: Suggest inserting "rain gauge" following "bucket".

Line 22-24: Suggest revising to: "A Wilcoxon rank sum test was used to assess whether hourly rainfall intensities differed significantly ( $p \leq 0.05$ ) between each year."

Line 24: It is unclear what "bulk monitoring data" refers to, total sediment yield?

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Line 20: replace "larger" with "longer"

Lines 22-24: It is unclear what information is trying to be conveyed by this sentence.

Line 25: It would be useful to explicitly define what an "integrated sample" is, as this may clear up the somewhat confusing text in this paragraph.

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End of line 12: it is unclear what is meant by "they".

Figure 2 caption

Change "base" to "basis".

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Figure 7

It is difficult to see red crosses in many of the panels.

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Interactive comment on Earth Surf. Dynam. Discuss., 1, 311, 2013.