Response to Reviewer #2:

Thank you very much for the constructive comments. We highly appreciate the time and efforts you put in reviewing our manuscript. Concerning your comments, we reply below.

This is a generally well written paper that discusses the use of Quantile Regression Forests (QRFs) as an alternative to sediment rating curves in the calculation of sediment loads. This approach is utilised further in an examination of the effects of seasonal forest logging and associated impacts in a Chilean paired catchment experiment. The approach and subject matter are likely to appeal to a wide audience.

Whilst this is a sound piece of research, I have some concerns about the Discussion as it relates to the relative impacts of the logging techniques used. In particular there appears a lack of any mention of the Best Management Practices (BMPs) or soil conservation measures that were employed during the logging operations. Figure 2 suggests that buffer strips were retained along watercourses but this is not mentioned. Similarly, no indication of the % of the catchments logged is provided. Was the logging mostly conducted on the ridges or was it on the lower slopes? What are the catchment slopes or gradients? All of these factors affect soil erosion and sediment delivery potential and the authors ought to address these issues prior to publication of the manuscript.

We thank the reviewer for this important comment, and agree that all of the mentioned catchment properties, management operations and the area affected by logging. Accordingly, we have expanded the study-site section as follows: "*Two catchments previously planted with Pinus radiata were logged by the same clear-cutting technique during different seasons: catchment #3 was clear cut during the winter rainy season (Jul-Aug 2009), and remained bare for ~1 year, whereas catchment #4 was harvested during the end of dry summer season (Mar-Apr 2010), and replanted in early spring 2010 (Sep-Oct 2010) (Figure 2a). Both catchments were reforested by Eucalyptus globulus (Schuller et al., 2013). Although clear-cutting is permitted under the Chilean standards, the forest companies are requested to adopt best management practices in accordance with Forest Stewardship Council*

certification agreements. Among others, these consider cable harvesting on slopes >30%, the use of ground skidders in areas of lower slopes, the maintenance of riparian buffer strips (which in the study sites are ~7.5 m wide both sides of the channel network) and piling up forestry residues along contour lines at the end of the harvesting operations. The logging of catchment #4 severely damaged the riparian buffer strip whereas the buffer strip in catchment #3 remained unaffected by the timber harvest. Overall, ~88% of the area of catchment #3 were logged, and more in catchment #4. The clear cut was done using heavy rubber-tired skidders to drag logs uphill to landings whereas cable logging was limited to steep slopes (Mohr et al., 2013) (Figure 2b). The loggings covered the entire catchment area including their ridges. Catchment #1 remained unlogged and covered with P. radiata, and served as a control catchment."

Further we added to the discussion section as follows: "*We exclude topographic controls on sediment flux since slope and stream gradient are highest in catchment #4 (Mohr et al., 2012) where the lowest sediment load had been observed. Sediment flux is expected to be even lower in this catchment assuming the appropriate adoption of best management practices such as maintenance of buffer strips (~7.5 m each) alongside the streams."*

In order to account for possible topographic controls on sediment flux we added as follows:" *The catchments have largely similar size, geology, soils, hydrogeology, and vegetation, but differing forestry practices. All catchments are comparable in terms of topography, e.g. catchment slopes range between 14.2° ± 8.6° and 20.4° ± 10.8°. A more detailed description and discussion of the catchments' morphometric features is stated in Huber et al. (2010) and Mohr et al (2012)."*

In previous papers (Huber et al., 2010, Bosque; and Mohr et al. 2012, JGR-Earth Surface) we presented and discussed the morphometric features of all catchments in a more detailed manner. We therefore added the corresponding references in the respective sections instead of substantially expanding this section of the manuscript.

In addition, the following points should be considered:

line 11 (abstract): the Q measurements may have been every 3 minutes but it is incorrectly implied that SSC was also measured every 3 min. This ambiguity should

be corrected.

We are sorry for the confusion and unintended ambiguity. We modified the manuscript accordingly.

line 20 (abstract): insert 'relative' before 'role'

Done and accordingly added.

line 22 (abstract): 'outperforms' should be changed to 'outperform'

Done and changed accordingly.

page 3, line 2: What is meant by 'man-made' forests? I presume these are plantation forests.

Correct. However, we decided to delete the corresponding sentence since it is not directly related to the topic of the manuscript (see review #1). This sentence does not add any necessary information required for understanding the manuscript.

page 4, line 8: Are the authors sure that noone else has used high-frequency Q and SSC time-series data? An Australian example recently did: Webb AA, Dragovich D & Jamshidi R (2012). Temporary increases in suspended sediment yields following selective eucalypt forest harvesting. Forest Ecology and Management, 283: 96-105. http://dx.doi.org/10.1016/j.foreco.2012.07.017

Thank you very much for this comment. We checked the reference of Webb et al. 2012. Though they showed high temporal resolution, they did not sample at such a high temporal resolution as we did based on the visual evaluation of the figures provided. Moreover, they only explicitly mention the temporal resolution of streamflow measurements (page 100: "*Stream gauges were located on bedrock controls upstream of tributary junctions on each stream and in similar geomorphic settings. Each station was instrumented with an automatic pump water sampler (ISCO 3700), a datalogger (Datataker DT50), pressure transducer and staff gauge, all powered by 12 V batteries charged by a solar panel. Stream height was logged at*

6-min intervals and converted to discharge using rating curves derived from velocity–area gaugings undertaken at a range of flows.
Water samples, 500 mL in volume, were automatically pumped from each stream by a stage-activated sampler (ISCO 3700 model) throughout all flood events on the rising and falling limbs of the hydrograph. In addition, weekly water samples were pumped from each stream during periods of baseflow."

page 5, line 2: What is meant by 'in average'? Average what? Is this an average yearly value or some other recurrence interval?
We are sorry for the ambiguity. Average in this case refers to average rainfall intensities on event-scale. We changed the manuscript accordingly to: "*The climate is Mediterranean, and rainfall intensities are low and only rarely exceed 10 mm/h during single events."*

page 5, line 21: see above comments re Webb et al. (2012). Is 3 min really so unique?
See comments above.

page 7: Given that QRFs are the focus of the paper, it would be sensible to switch sections 3.2 and 3.3 to bring the QRFs ahead of the SRCs in the methods and results.
We agree and switched the sections accordingly.

page 8, line 16: replace 'for' with 'to'
Done and corrected.

page 14, line 25: replace 'higher' with 'greater'
Done and corrected.

page 20, Fig 2 caption: replace ’event-base’ with ’event-basis’

Done and corrected.