TURBIDITY AND CONDUCTIVITY CHANGES DURING STORM EVENTS IN REPEAT-SELECTIVELY-LOGGED AND OLD REGROWTH LIGHTLY LOGGED RAINFOREST CATCHMENTS IN SABAH

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Background

Rainforest logging causes significant changes to soil properties that contributes to greatly enhanced overland flow that increases erosion and dilutes stream water. Much research has focused on the immediate erosional impacts but few on the long term recovery - Greer *et. al.* (1996) and Douglas *et. al.* (1999) being notable exceptions.

Aim

1. To understand how a thrice logged tropical catchment differ from an old regrowth lightly logged forest in turbidity (sediment yield) and conductivity (dissolved solids) during storm events.
2. To find out if the thrice logged catchment have recovered from logging from the aspect of sediment yield.

Methods

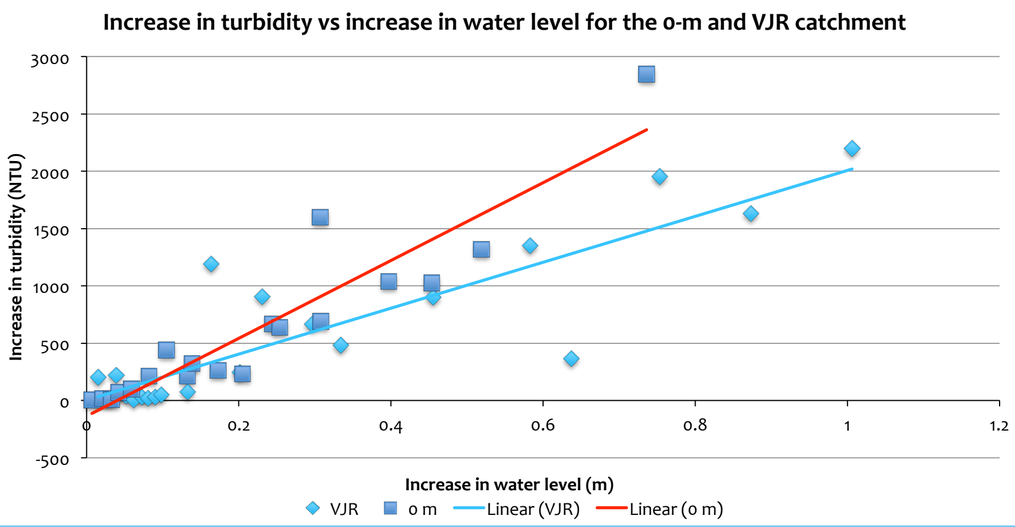
1. Two tropical rainforest catchments of approximately the same size (2.6 km^2 ± SD 0.1) and slope angle (16˚ ± SD 2) were used. The 0-m catchment is thrice-selectively-logged where it was last logged in the mid 2000s. The Virgin Jungle Reserve (VJR) is an old regrowth that was lightly logged once in the 1980s.
2. Streams of both catchments were installed with dataloggers and sensors that record rainfall, water level, turbidity and conductivity every 5 minutes.
3. For both streams, random storm events were selected to cover a range of water level increases. Changes in turbidity (sediment yield) and conductivity (dissolved solids) were plotted against increases in water level.

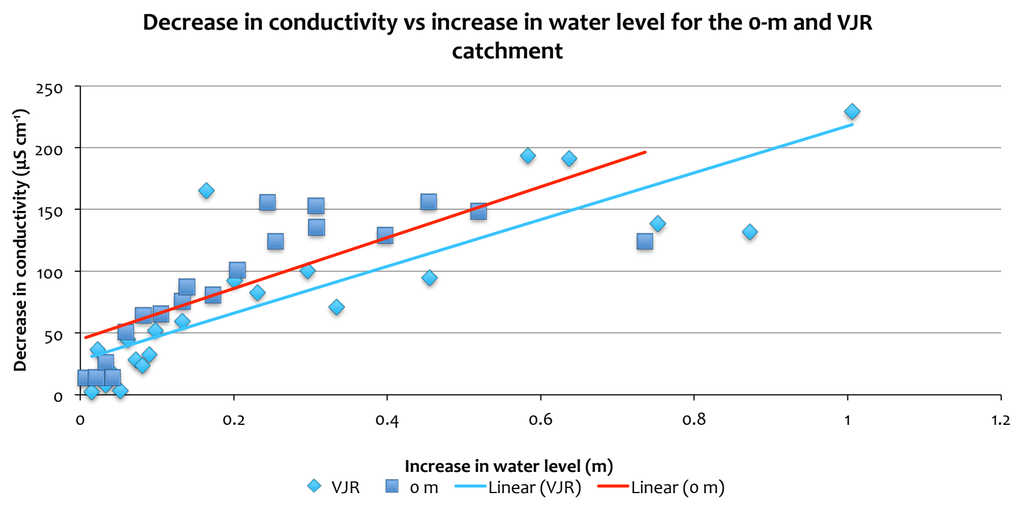

Datalogger and raingauge

Turbidity sensor mounted on steel frames

The water level and conductivity sensors

Results and Discussion





Both graphs show a higher value for the 0-m compared to the VJR. This shows that sediment transport is greater in the 0-m catchment compared to that of the VJR. The greater stream water dilution in the 0-m stream suggests that there is more overland flow instead of interception and infiltration. This shows that the sediment yield of the 0-m catchment have not yet recover to that of an undisturbed forest catchment. A 5-phase model proposed by Clarke & Walsh (2006) suggests that it may take up to 15 years post logging for sediment yield to return to pre logging levels.

Conclusion

Increases in turbidity and decreases in conductivity in the 0-m stream is higher than that in the VJR stream during storm events. This suggests that the 0-m stream have yet to fully recover from logging.

References

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