Seasonal Logging, Process Response, and Geomorphic Work

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SUPPLEMENTARY MATERIAL

1 Supplementary Table 1: Predictor variables used for QRF-modelling.

Predictors	Description
$Q_{1\text{-}3}$	Discharge accumulated over 1-3 minutes prior the SSC measurement
$Q_{4\text{-}9}$	Discharge accumulated over 4-9 minutes prior the SSC measurement
$Q_{10\text{-}27}$	Discharge accumulated over 10-27 minutes prior the SSC measurement
$Q_{28\text{-}81}$	Discharge accumulated over 28-81 minutes prior the SSC measurement
$Q_{82\text{-}243}$	Discharge accumulated over 82-243 minutes prior the SSC measurement
$Q_{244\text{-}729}$	Discharge accumulated over 244-729 minutes prior the SSC measurement
P_0	Rainfall registered at the same time of the SSC measurement
$P_{1\text{-}3}$	Rainfall accumulated over 1-3 minutes prior the SSC measurement
$P_{4\text{-}9}$	Rainfall accumulated over 4-9 minutes prior the SSC measurement
$P_{10\text{-}27}$	Rainfall accumulated over 10-27 minutes prior the SSC measurement
$P_{28\text{-}81}$	Rainfall accumulated over 28-81 minutes prior the SSC measurement
$P_{82\text{-}243}$	Rainfall accumulated over 82-243 minutes prior the SSC measurement
$P_{244\text{-}729}$	Rainfall accumulated over 244-729 minutes prior the SSC measurement
$P_{730\text{-}2187}$	Rainfall accumulated over 730-2187 minutes prior the SSC measurement
$P_{2188\text{-}6561}$	Rainfall accumulated over 2188-6561 minutes prior the SSC measurement
$P_{6562\text{-}19683}$	Rainfall accumulated over 6562-19683 minutes prior the SSC measurement
$P_{19684\text{-}59049}$	Rainfall accumulated over 19684-59049 minutes prior the SSC measurement
limb	Raising of falling discharge limb during SSC measurement
day of year	Day of year
earthquake	Switch variable separating pre- from post-earthquake sample periods
logging	Continuous counter variable starting at the time of the clear cutting

Supplementary Table 2: Performance of Quantile Regression Forest models (QRF) and sediment rating curves (SRC) with 20-fold cross-validation of SSC predictions using root mean squared error (RMSE). *20 parameters; ** 21 parameters; *** 2 parameters.

Catchment	SSC range (g l^{-1})	RMSE (g l^{-1})	
		QRF	SRC*** (SSC = aQ^b)
#1	0.002-0.332	0.01*	0.03
#3	0.004-3.646	0.06**	0.07
#4	0.007-0.363	0.05**	0.10

Supplementary Table 3: Bulk data and modelled annual suspended sediment yields in 2009 and 2010 at the catchment outlets of control catchment (#1), rainy-season clear cutting (#3) and dry-season clear cutting (#4). Annual rainfall yields from local rain gauges (Mohr et al., 2012); errors are ±1 standard deviation.

	Year	Catchment #1 (t ha^{-1} yr)	Catchment #3 (t ha^{-1} yr)	Catchment #4 (t ha^{-1} yr)	Rainfall (mm yr^{-1})
Measured bulk data	2009	0.15	0.28	0.22	1463.9
	2010	0.56	0.88	0.55	1120.8
QRF	2009	0.06±0.00	0.83±0.01	0.39±0.00	
	2010	0.14±00	2.43±0.08	0.48±0.01	
SRC	2009	0.02	0.08	0.12	
	2010	0.02	0.12	0.14	

Supplementary Table 4: Monthly suspended-sediment yields [kg/ha] based on bulk data during the study period 2009-2010 at the catchment outlets; errors are ±1 standard deviation. Grey shaded cells are post-logging periods. Monthly rainfall from rain gauges #1, #2 and #3 (Figure 1b).

Study period	Monthly SSY Catchment #1 (kg ha^{-1})	Monthly SSY Catchment #3 [(kg ha^{-1})	Monthly SSY Catchment #4 (kg ha^{-1})	Monthly rainfall (mm)
01/2009	0.4	2.0	1.1	3.44
02/2009	0.3	1.8	0.8	6.45
03/2009	0.4	6.3	0.9	2.37
04/2009	0.3	0.2	1.5	14.94
05/2009	1.2	4.6	4.1	207.60
06/2009	34.2	62.9	28.5	371.48
07/2009	42.8	73.2	24.6	160.61
08/2009	50.3	103.3	132.2	372.26
09/2009	12.8	10.5	15.9	88.40
10/2009	2.3	6.9	3.1	146.41
11/2009	2.7	3.0	6.1	83.17
12/2009	1.7	3.2	2.2	6.72
01/2010	2.0	3.0	1.6	10.96
02/2010	2.7	4.8	3.1	81.42
03/2010	1.4	6.1	3.9	6.97
04/2010	1.4	8.6	4.4	1.49
05/2010	3.3	23.8	17.0	62.50
06/2010	21.4	84.5	119.6	316.77
07/2010	342.2	117.6	230.1	214.35

08/2010	177.3	448.7	131.7	258.97
09/2010	7.1	25.2	24.9	23.51
10/2010	3.5	39.9	4.6	38.84
11/2010	1.6	114.2	5.5	48.80
12/2010	0.6	3.3	5.6	55.78

Supplementary Table 5: Monthly SSY [kg/ha] estimates by QRF during study period 2009-2010 at the catchment outlets. Errors are ±1 standard deviation. Grey shaded cells indicate post-logging periods.

Study period	Monthly SSY Catchment #1 (kg ha^{-1})	Monthly SSY Catchment #3 (kg ha^{-1})	Monthly SSY Catchment #4 (kg ha^{-1})
01/2009	0.15±0.00	2.72±0.04	1.81±0.02
02/2009	0.11±0.00	2.27±0.04	1.04±0.01
03/2009	0.10±0.00	1.84±0.03	0.55±0.00
04/2009	0.00±0.00	0.00±0.00	0.00±0.00
05/2009	0.09±0.00	0.70±0.05	0.21±0.01
06/2009	6.48±0.11	40.50±1.20	33.37±0.36
07/2009	13.02±0.39	62.09±2.95	35.04±0.48
08/2009	24.95±0.44	481.91±10.57	120.63±1.65
09/2009	6.62±0.07	84.26±1.16	22.51±0.21
10/2009	5.65±0.07	60.45±0.73	12.51±0.10
11/2009	3.20±0.03	55.55±0.74	8.54±0.08
12/2009	1.17±0.01	38.75±0.50	6.24±0.04
01/2010	0.48±0.00	30.08±0.41	4.55±0.04
02/2010	0.78±0.04	28.78±0.41	4.03±0.04
03/2010	0.45±0.00	29.14±0.41	5.78±0.04
04/2010	0.00±0.00	0.01±0.00	0.00±0.00
05/2010	0.07±0.00	3.90±0.15	0.97±0.02
06/2010	5.32±0.17	117.28±2.09	46.54±0.56
07/2010	57.58±1.41	232.17±5.86	99.39±1.15
08/2010	67.89±2.45	1814.79±76.20	121.28±2.84

09/2010	2.79±0.03	58.56±0.75	11.02±0.10
10/2010	1.52±0.02	46.56±0.58	4.57±0.05
11/2010	0.99±0.01	44.61±0.60	6.34±0.06
12/2010	0.45±0.00	34.12±0.43	3.35±0.03

Supplementary Table 6: Average predicted SSC-values based on the QRF and SRC approach. *In order to account for disturbed conditions of catchments #3 and #4, both years (2009 and 2010) were averaged separately.

Catchment	Predicted SSC (QRF) (g l^{-1})		Predicted SSC (SRC) (g l^{-1})	
	mean	median	mean	median
#1	0.01	0.01	0.09	0.03
#3*	0.16	0.18	0.04	0.02
#4*	0.05	0.05	0.04	0.02