JGR-Earth Surface

Supporting Information for

Lithologic effects on landscape response to base level changes: a modeling study in the context of the eastern Jura Mountains, Switzerland

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Supplementary Material Table S1: Summary of CHILD landscape evolution model parameters used in each simulation.

	Fluvial bedrock erosion				Sediment transport		Hillslope		Climate	Tectonics	
Simulation ID	Min k_f ($m^{1/2}s^2/kg^{3/2}$)	Max k_f ($m^{1/2}s^2/kg^{3/2}$)	TauD (kg/ms^2)	Detach Lim Only?	K_T ($m^{1/2}s^2/kg^{3/2}$)	Tauc (kg/ms^2)	KD (m^2/yr)	Initial regolith/Molasse thickness (m)	Uniform PPT Rate (m/yr)	Min Uplift Rate (mm/yr)	Max uplift rate (mm/yr)
Uniform Lithology Runs											
Baseline Model											
UL001	1.00E-06	1.00E-06	0	on	N/A	N/A	0.001	10	1	0.05	1.5
Sensitivity:											
UL002	1.00E-05	1.00E-05	0	on	N/A	N/A	0.001	10	1	0.05	1.5
UL003	1.00E-07	1.00E-07	0	on	N/A	N/A	0.001	10	1	0.05	1.5
UL004	1.00E-06	1.00E-06	10	on	N/A	N/A	0.001	10	1	0.05	1.5
UL005	1.00E-06	1.00E-06	100	on	N/A	N/A	0.001	10	1	0.05	1.5
UL006	1.00E-05	1.00E-05	10	on	N/A	N/A	0.001	10	1	0.05	1.5
UL007	1.00E-05	1.00E-05	100	on	N/A	N/A	0.001	10	1	0.05	1.5
UL008	1.00E-06	1.00E-06	0	on	N/A	N/A	0.01	10	1	0.05	1.5
UL009	1.00E-06	1.00E-06	0	on	N/A	N/A	0.0001	10	1	0.05	1.5
UL010	1.00E-06	1.00E-06	0	off	2.00E-05	0	0.001	10	1	0.05	1.5
UL011	1.00E-06	1.00E-06	0	off	2.00E-05	10	0.001	10	1	0.05	1.5
UL012	1.00E-06	1.00E-06	0	off	2.00E-04	0	0.001	10	1	0.05	1.5
UL013	1.00E-06	1.00E-06	0	off	2.00E-06	0	0.001	10	1	0.05	1.5
UL014	1.00E-06	1.00E-06	0	on	N/A	N/A	0.1	10	1	0.05	1.5
UL015	1.00E-05	1.00E-05	10	on	N/A	N/A	0.01	10	1	0.05	1.5
UL016	1.00E-06	1.00E-06	0	off	2.00E-05	0	0.01	10	1	0.05	1.5
UL017	1.00E-06	1.00E-06	0	off	2.00E-05	10	0.01	10	1	0.05	1.5
UL018	1.00E-06	1.00E-06	0	off	2.00E-05	0	0.01	800	1	0.05	1.5
UL019	1.00E-06	1.00E-06	0	off	2.00E-05	10	0.01	800	1	0.05	1.5
UL020	1.00E-06	1.00E-06	0	off	2.00E-04	0	0.01	800	1	0.05	1.5
UL021	1.00E-06	1.00E-06	0	off	2.00E-04	10	0.01	800	1	0.05	1.5
Variable lithology model runs											
Baseline Model											
VL001	1.00E-06	2.00E-06	0	on	N/A	N/A	0.01	10	1	0.05	0.23
Sensitivity:											
Material Properties											
VL002	7.50E-07	2.50E-05	0	on	N/A	N/A	0.01		1	0.05	0.23
VL003	5.00E-07	5.00E-05	0	on	N/A	N/A	0.01	10	1	0.05	0.23
VL004	5.00E-06	5.00E-06	0	on	N/A	N/A	0.005	10	1	0.05	0.23
VL005	1.00E-06	1.00E-05	0	on	N/A	N/A	0.005	10	1	0.05	0.23
VL006	1.00E-06	1.00E-05	0	on	N/A	N/A	0.001	10	1		0.23
VL007	1.00E-06	5.00E-06	0	on	N/A	N/A	0.01	10	1	0.05	0.23
Erosion physics											
VL008	1.00E-06	2.00E-06	0	off	2.00E-05	0	0.01	10	1	0.05	0.23
VL009	1.00E-06	1.00E-05	50	on	N/A	N/A	0.01	10	1	0.05	0.23
VL010	1.00E-06	1.00E-05	0	off	2.00E-05	0	0.001	10	1	0.05	0.23
VL011	1.00E-06	1.00E-05	0	off	2.00E-05	10	0.001	10	1	0.05	0.23
VL012	1.00E-06	1.00E-05	0	off	2.00E-05	100	0.001	10	1	0.05	0.23
VL013	1.00E-06	1.00E-05	0	off	2.00E-05	10	0.005	10	1	0.05	0.23
VL017	7.50E-05	2.50E-05	0	on	N/A	N/A	0.01	10	1	0.05	0.23
VL019	1.00E-06	2.00E-06	0	on	N/A	N/A	0.1	10	1	0.05	0.23
VL020	2.00E-06	4.00E-06	0	on	N/A	N/A	0.01	10	1	0.05	0.23
VL021	1.00E-06	1.00E-05	0	on	N/A	N/A	0.001	10	1	0.05	0.23
Tectonics											
VL014	5.00E-07	5.00E-06	0	on	N/A	N/A	0.001	10	1	0.05	Uplift divided by two (but not background)
VL015	5.00E-07	5.00E-06	0	on	N/A	N/A	0.001	10	1	0.1	0.23
VL016	5.00E-07	5.00E-06	0	on	N/A	N/A	0.001	10	1	0.1	Uplift divided by two (but not background)
VL018	1.00E-06	2.00E-06	0	on	N/A	N/A	0.01	10	1	uniform uplift at 0.1mm/yr	

Supplementary Material Table S2: Parameter space explored for the horizontal lithology experiments.

	Fluvial bedrock erosion				Sediment transport		Hillslope	
Simulation ID	Min k_f ($m^{1/2}s^2/kg^{3/2}$)	Max k_f ($m^{1/2}s^2/kg^{3/2}$)	Crit. Shear stress for rock detachment TauD (kg/ms^2)	Detach Lim Only?	K_T ($m^{1/2}s^2/kg^{3/2}$)	Crit. Shear stress for sedimetn detachment Tauc (kg/ms2)	Hillsllope diffusivity KD (m^2/yr)	Initial regolith/Molasse thickness (m)
HL001	1.00E-06	1.00E-07	0	1	n/a	0	0.001	500
HL002	1.00E-05	1.00E-06	0	1	n/a	0	0.001	500
HL003	1.00E-05	1.00E-07	0	1	n/a	0	0.001	500
HL004	1.00E-06	1.00E-07	0	1	n/a	0	0.001	10
HL005	1.00E-05	1.00E-06	0	1	n/a	0	0.001	10
HL006	1.00E-05	1.00E-07	0	1	n/a	0	0.001	10
HL007	1.00E-06	1.00E-07	0	1	n/a	0	0.001	800
HL008	1.00E-05	1.00E-06	0	1	n/a	0	0.001	800
HL009	1.00E-05	1.00E-07	0	1	n/a	0	0.001	800
HL010	1.00E-06	1.00E-07	10	1	n/a	10	0.001	10
HL011	1.00E-05	1.00E-06	10	1	n/a	10	0.001	10
HL012	1.00E-05	1.00E-07	10	1	n/a	10	0.001	10
HL013	1.00E-06	1.00E-07	100	1	n/a	100	0.001	10
HL014	1.00E-05	1.00E-06	100	1	n/a	100	0.001	10
HL015	1.00E-05	1.00E-07	100	1	n/a	100	0.001	10
HL016	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	500
HL017	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	10
HL018	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	800
HL019	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	500
HL020	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	10
HL021	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	800
HL022	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	500
HL023	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	10
HL024	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.001	800
HL025	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	500
HL026	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	10
HL027	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.001	800
HL028	1.00E-05	1.00E-06	0	0	2.00E-04	0	0.001	10
HL029	1.00E-05	1.00E-06	100	0	2.00E-04	100	0.001	10
HL030	1.00E-05	1.00E-06	0	0	2.00E-06	0	0.001	10
HL031	1.00E-05	1.00E-06	100	0	2.00E-06	100	0.001	10
HL032	1.00E-05	1.00E-06	10	1	n/a	10	0.01	10
HL033	1.00E-05	1.00E-06	100	1	n/a	100	0.01	10
HL034	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.01	10
HL035	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.01	10
HL036	1.00E-05	1.00E-06	0	0	2.00E-05	0	0.01	10
HL037	1.00E-05	1.00E-06	100	0	2.00E-05	100	0.01	10
HL038	1.00E-05	1.00E-06	10	1	n/a	10	0.0001	10

HL039	1.00E-05	1.00E-06	100	1	n/a		100	0.0001	10
HL040	1.00E-05	1.00E-06	0	0		2.00E-05	0	0.0001	10
HL041	1.00E-05	1.00E-06	100	0		2.00E-05	100	0.0001	10
HL042	1.00E-05	1.00E-06	0	0		2.00E-05	0	0.0001	10
HL043	1.00E-05	1.00E-06	100	0		2.00E-05	100	0.0001	10
HL044	1.00E-06	2.00E-06	50	1	n/a		0	0.1	500
HL045	2.00E-06	6.00E-06	50	1	n/a		0	0.01	800
HL046	3.00E-06	6.00E-06	50	1	n/a		0	0.1	500
HL047	3.00E-05	6.00E-05	50	1	n/a		0	0.1	500
HL048	3.00E-06	6.00E-06	0	1	n/a		0	0.1	500