

Table S1: Characterization of the hydrodynamic conditions over the control streambed and the bedforms of the landscapes increasing in flow heterogeneity. R_{xyz} ... mean length of 3D velocity vector, TKE...turbulent kinetic energy, TI...turbulence intensity; given are mean values \pm standard deviation for average and spatial variation of hydrodynamic conditions ($n = 80$ for each flume, except slope and flume-scale velocity).

	Height of bedforms in the mesocosms – flow heterogeneity treatment					
	no bedforms	2 cm	4 cm	6 cm	8 cm	10 cm
Slope (‰)	0.1	0.1	0.5	1.25	2.0	3.0
R_{xyz} (cm s ⁻¹) [▲]	7.9 \pm 1.6	8.0 \pm 1.9	6.8 \pm 2.5	8.5 \pm 3.5	8.6 \pm 4.1	12.6 \pm 6.3
Depth (cm) [▲]	-6.3 \pm 0.3	-6.5 \pm 0.8	-7.5 \pm 1.4	-6.9 \pm 1.8	-6.5 \pm 2.1	-6.7 \pm 2.8
TKE (J) [▲]	2.0 \pm 0.6	2.0 \pm 0.9	1.7 \pm 1.0	2.7 \pm 1.9	2.6 \pm 2.0	6.6 \pm 7.1
TI (%) [▲]	41.9 \pm 32.5	41.8 \pm 38.7	48.6 \pm 43.7	50.0 \pm 42.7	50.1 \pm 44.6	50.2 \pm 41.1
Velocity [□]	7.63 \pm 0.31	7.77 \pm 0.36	7.77 \pm 0.34	7.53 \pm 0.40	7.67 \pm 0.38	7.16 \pm 0.42

[▲] derived from acoustic Doppler velocimetry, $n = 80$ measurements regularly distributed over one entire bedform.

[□] flume-scale mean velocity calculated from nominal travel time of conservative tracer NaCl, $n = 12-16$ injections per flume.