Supplement of Hydrol. Earth Syst. Sci., 23, 4869–4889, 2019
https://doi.org/10.5194/hess-23-4869-2019-supplement

Hydrology and Earth System Sciences
Open Access
EGU

Supplement of

Spatio-temporal relevance and controls of preferential flow at the landscape scale

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Table S1: Additional textural information and standard deviation (sd) of the soils sampled in the different landscape units.

		Sand	sd	Silt	sd	Clay	sd	No. of samples
Slate	**Forest**	10	15	52	10	38	6	38
	Grassland	11	13	49	9	40	6	17
Marl	**Forest < 30 cm**	32	25	45	21	23	8	16
	Forest > 30 cm	estimated by field test >50% Clay						0
	Grassland < 30 cm	24	16	46	14	30	6	46
	Grassland > 30 cm	16	12	36	7	48	16	12
Sandstone	**Forest**	64	11	20	8	16	5	32
	Grassland	58	5	23	4	19	2	8

Table S2: van Genuchten (1980) parameters optimized by Sprenger et al. (2016). Site IDs with an "x" indicate sites were the best fit of the respective geology was used, because the site was not optimized. Subscripts indicate the respective depth of the parameter. K_s is given in cm day^{-1} and α in cm^{-1}.

Site ID	θ_{s10}	α_{10}	n_{10}	K_{s10}	θ_{s30}	α_{30+50}	n_{30+50}	K_{s30}	θ_{s50}	K_{s50}
M_A	0.530	0.010	1.309	842	0.436	0.011	1.311	845	0.496	185
M_B	0.598	0.040	1.213	10	0.409	0.015	1.075	979	0.469	765
M_C_x	0.545	0.027	1.265	314	0.447	0.029	1.200	675	0.442	293
M_D_x	0.545	0.027	1.265	314	0.447	0.029	1.200	675	0.442	293
M_E	0.580	0.070	1.190	423	0.499	0.077	1.178	417	0.456	49
M_F_x	0.545	0.027	1.265	314	0.447	0.029	1.200	675	0.442	293
M_G_x	0.545	0.027	1.265	314	0.447	0.029	1.200	675	0.442	293
M_H	0.453	0.020	1.193	451	0.452	0.074	1.185	985	0.439	15
M_I	0.544	0.029	1.236	356	0.390	0.012	1.154	360	0.374	436
M_J	0.600	0.013	1.237	82	0.491	0.011	1.176	700	0.419	588
M_K	0.512	0.004	1.476	35	0.451	0.003	1.321	438	0.440	10
S_A	0.547	0.008	1.316	180	0.326	0.004	1.299	348	0.434	715
S_B	0.503	0.071	1.265	595	0.353	0.017	1.287	643	0.358	550
S_C	0.556	0.087	1.249	53	0.338	0.015	1.195	689	0.321	172
S_D	0.538	0.039	1.328	10	0.400	0.028	1.319	915	0.480	130
S_E	0.562	0.036	1.379	375	0.400	0.012	1.383	418	0.339	24
S_F_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_G	0.577	0.100	1.278	769	0.302	0.023	1.285	1000	0.437	373
S_H	0.520	0.071	1.296	646	0.419	0.006	1.584	853	0.495	233
S_I	0.569	0.003	1.526	580	0.409	0.010	1.221	1000	0.448	383
S_J_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_K_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_L_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_M	0.516	0.015	1.298	525	0.440	0.002	1.894	249	0.436	736
S_O	0.524	0.016	1.325	748	0.412	0.010	1.259	612	0.500	144
S_P	0.427	0.013	1.267	351	0.413	0.002	1.895	244	0.437	89
S_Q	0.543	0.021	1.314	278	0.478	0.010	1.382	501	0.479	469
S_R_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_S	0.477	0.048	1.270	931	0.300	0.016	1.229	872	0.409	150
S_T	0.470	0.012	1.374	1000	0.314	0.006	1.335	728	0.469	426
S_U	0.559	0.003	1.557	513	0.433	0.002	1.365	757	0.411	999
S_V_x	0.526	0.038	1.335	531	0.377	0.011	1.384	648	0.432	360
S_W	0.522	0.060	1.319	948	0.300	0.017	1.219	545	0.454	164
Sa_A	0.516	0.038	1.340	494	0.450	0.006	1.686	795	0.500	1000
Sa_B	0.469	0.043	1.187	439	0.417	0.017	1.170	848	0.373	627
Sa_C	0.596	0.075	1.235	585	0.382	0.003	1.425	617	0.445	931
Sa_D	0.456	0.030	1.298	632	0.404	0.009	1.325	812	0.496	1000
Sa_E	0.521	0.050	1.204	431	0.366	0.003	1.205	98	0.332	318
Sa_F	0.573	0.001	1.818	10	0.469	0.001	1.650	72	0.492	995
Sa_G	0.546	0.033	1.228	528	0.319	0.005	1.194	132	0.470	532
Sa_H	0.464	0.061	1.225	234	0.338	0.013	1.384	444	0.411	924
Sa_I	0.529	0.038	1.329	598	0.400	0.005	1.354	501	0.400	877
Sa_J	0.452	0.079	1.165	268	0.400	0.003	1.231	456	0.464	977
Sa_K	0.493	0.022	1.286	181	0.425	0.020	1.297	805	0.495	718
Sa_L	0.456	0.054	1.242	915	0.427	0.028	1.347	509	0.486	477

Table S3: Number of infiltration events for the different response classifications and depth. These infiltration events are the data basis for Table 3 and 4 and Figure 4, 8, 9. Note: a SR 50 response results always in two measured maximum pore water velocity (v_{max}), 10-30 and 30-50 cm.

	Slate		Marl		Sandstone		
	Forest	Grassland	Forest	Grassland	Forest	Grassland	Total
SR 30	319	113	68	59	198	64	821
SR 50	326	92	84	57	262	89	910
NSR 10 - 50	103	11	34	12	42	13	215
NSR 30	174	48	60	43	39	17	381
NSR 50	118	16	24	4	18	7	187
NC - no resp.	1285	529	265	480	730	362	3651
NC – 10 cm	650	312	198	197	582	146	2085
Total	2975	1121	733	852	1871	698	8250

Table S4: Number of infiltration events for the four defined volumetric soil moisture quartiles. These infiltration events are the data basis for Figure 6.

		quartile of vol. soil moisture			
		1 - lowest	2	3	4 - highest
Slate	**Forest**	769	792	835	579
	Grassland	290	285	306	240
Marl	**Forest**	178	192	182	181
	Grassland	211	232	224	185
Sandstone	**Forest**	563	467	486	355
	Grassland	156	171	210	161

Table S5: Number of infiltration events recorded in total in each month and the minimum and maximum number recorded in single years. These infiltration events are the data basis for Figure 7.

	Forest			Grassland		
	total	min. single year	max. single year	total	min. single year	max. single year
Jan	487	22	167	176	17	82
Feb	408	25	166	142	8	63
Mar	266	6	97	144	2	77
Apr	389	24	149	194	15	70
May	490	60	141	336	12	140
Jun	482	66	115	240	39	62
Jul	425	50	133	210	29	63
Aug	641	70	202	268	21	107
Sep	375	52	107	133	5	55
Oct	523	59	185	250	12	90
Nov	515	68	145	280	31	100
Dec	578	35	249	298	18	129

Table S6: Number of maximum pore water velocity records for the four defined volumetric soil moisture quartiles used for Fig. 11. The number includes v_{max} observed at both depth (10-30 and 30-50 cm).

		quartile of vol. soil moisture			
		1 - lowest	2	3	4 - highest
Slate	**Forest**	168	299	302	202
	Grassland	58	67	99	73
Marl	**Forest**	47	77	61	51
	Grassland	41	87	37	8
Sandstone	**Forest**	210	172	177	163
	Grassland	27	62	83	70

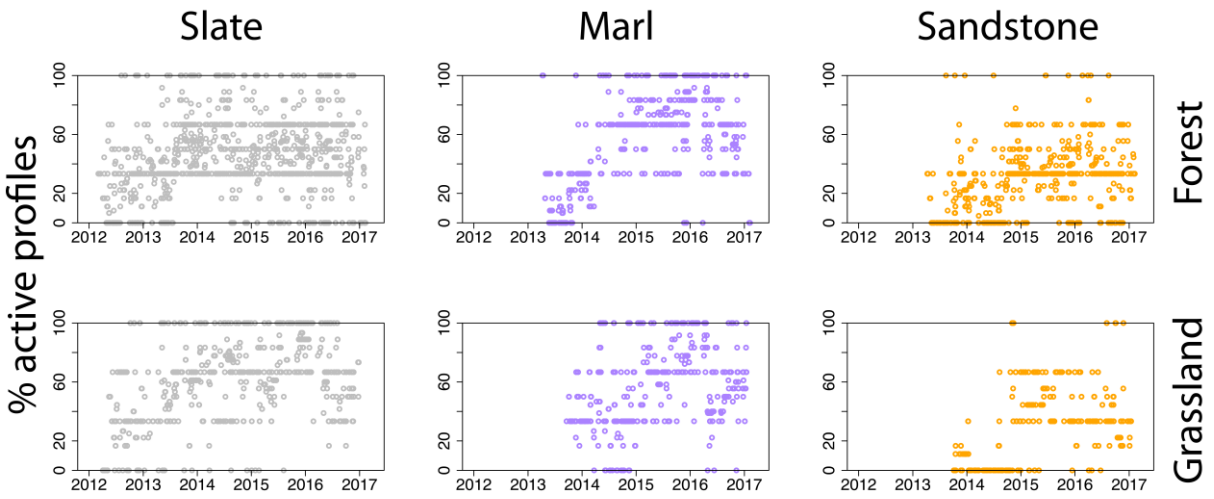

Figure S1: Proportion of soil moisture profiles which met all quality criteria (active) for profiles and days with registered rainfall (= # active profiles / #profile that registered rainfall).