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Supplement of

Identification of runoff formation with two dyes in a mid-latitude mountain headwater

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Tab. S1 Overview of research questions, hypotheses and their rationales for the Rokytká headwater.

Podzol (PZ2)					Peat Bog (PB3)		
Topic	Process	Statement	Expected	Result	Statement	Expected	Result
Runoff Formation	no HOF	no significant infiltration resistance	likely	confirmed	no significant infiltration resistance	likely	confirmed
	SOF1, SSF1	lateral SOF and/or biomat flow	possible	confirmed	lateral SOF and/or biomat flow	likely	confirmed
	SSF2, SSF3	lateral pipeflow/lateral matrix flow	possible	rejected / confirmed	lateral pipeflow/lateral matrix flow	possible	confirmed / confirmed
	no GWR	no phreatic zone in soil and negligible lateral flow in deeper soil horizons	likely	confirmed	transmissivity feedback (possible rain-on-snow, large storms)	possible	not proven
	DP	deep percolation to bedrock aquifer	likely	not proven	not connected – vertically	unlikely	confirmed
	GWR	bedrock aquifer/phreatic zone: lateral GW flow in bedrock fissures	likely	not proven	not connected – laterally	likely	confirmed
Sodium-Fluorescein (FLC)	-	Suitable tracer for mineral soils (low pH controlled/buffered by NaOH)	likely	confirmed	Suitable tracer for mineral soils (low pH controlled/buffered by NaOH)	likely	rejected
	HOF/SOF	dye identifies surface flow or lateral near-surface flow (biomat flow, Gerke et al. 2009, 2014)	likely	confirmed	dye identifies surface flow or lateral near-surface flow (biomat flow, Gerke et al. 2009, 2014)	likely	rejected
	SSF/GWR	FLC detects hydrological connectivity between irrigation test plot and spring or stream	possible	not proven	dye detects hydrological connectivity between irrigation test plot and spring or stream	possible	not proven
	no GWR	if detectable, dye identified in vadose zone (soil staining) and flowpath detection	likely	not proven	if detectable, dye likely identified in Acrotelm only	unlikely	not proven
	SSF	if detectable, slow response (days) in the stream; deep flowpath in the bedrock	possible	not proven	if detectable, possibly quick response (minutes) in the stream	possible	not proven
Brilliant Blue (BB)	-	suitable tracer for light-colored mineral soils	likely	confirmed	BB is likely a less suitable tracer for dark-colored peaty soils: BB difficult to detect in dark soils.	possible	rejected
	-	identifies vertical flow structures in soil (macropores, matrix)	likely	confirmed	identifies vertical flow structures (macropores, matrix)	likely	confirmed
	SSF/GWR	BB identifies lateral flow structures in soil (pipes, matrix)	likely	confirmed	dye identifies lateral flow structures (pipes, matrix)	likely	confirmed
	no GWR	if detectable, dye likely identified underneath the irrigation plot only	likely	confirmed	if detectable, dye likely identified in Acrotelm only	unlikely	confirmed
	SSF	if detectable, dye possibly stains major lateral pathways (soil pipes)	possible	confirmed	if detectable, dye possibly stains major lateral pathways (soil pipes)	possible	confirmed

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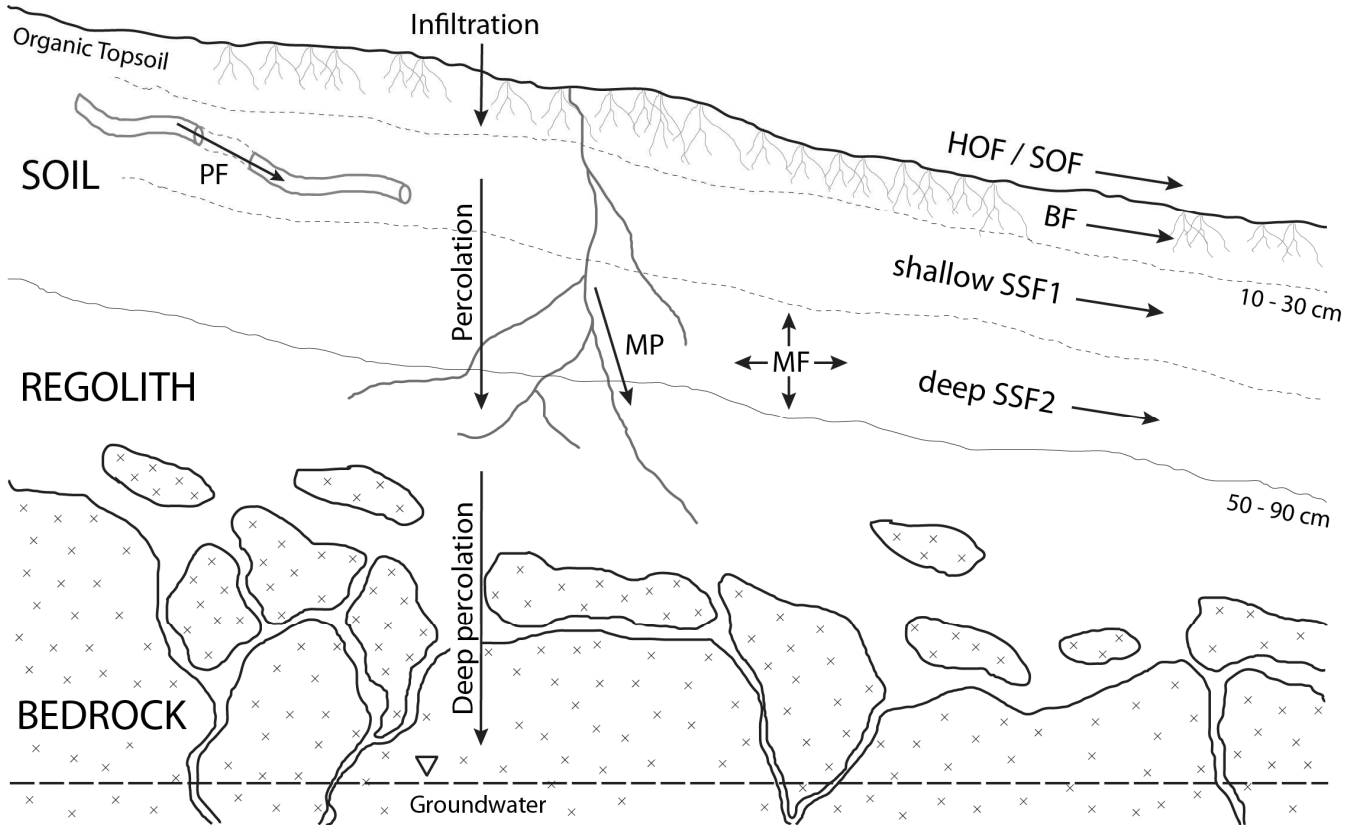


Fig. S1 Terminology of the runoff formation processes used in the Šumava hillslope hydrology study. HOF = Hortonian overland flow; SOF = Saturation overland flow; BF = Biomat flow; SSF = Subsurface stormflow; PF = Pipeflow (lateral); MP = Macropore flow (vertical); MF = Matrix flow.

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