

The study is focused on character of flow, permeability, mean residence of water, chemical composition of water and chemical fluxes in unsaturated zone of castellated sandstone at Klokočské Skály area. Soil water as well as the water seeping from up to 15 m thick sandstone unsaturated zone consists of mixture of: A) Component with mean residence time 2-4 months (50-75% of mixture) and B) Component with mean residence time exceeding 4 years (25-50% of mixture). In winter the component A is missing in K3 drip place probably because of freezing conditions, which prevent infiltration of the fast component. Sulfates are the most abundant anion in studied waters with chemical flux in sandstone unsaturated zone (SUZ) 7-10 g/m²/year, which exceeds several times the influx from total (wet and dry) atmospheric deposition (1.2 g/m²/year). On the other hand nitrates flux is decreasing with depth (atmospheric deposition 1.7 g/m²/year; flux in SUZ 0.2-0.4 g/m²/year).

Aluminum is the most abundant cation in SUZ (average concentration 6.3 mg/l, max. 35 mg/l). Flux of aluminum in SUZ is 2.5 g/m²/year, which is 80 times more than atmospheric deposition. Surprisingly the forest vegetation does not seem to suffer any directly visible damage. Silica is another substance which is intensively leached from SUZ.

The most prominent biochemical cycling in soil zone was found in case of potassium at top of the soil with peak in concentration in autumn reaching 10-15 mg/l.