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The epikarst as a part of the karst outcrop (and aquifer) represents a complex point of contact and mixing of unconsolidated material from the terrain surface, carbonate rocks altered by “corrosive” water, flora and fauna (and remains of), which is partially saturated with groundwater. Recharge of karst aquifers, usually, occurs via the unsaturated zone which uppermost part could be epikarst zone. However, in most of the cases the functioning of this zone has not yet been clarified. Significant amounts of (plant accessible) water, and other solutes and particles, can be stored in this zone for extended periods of time. Thus, attenuation or biochemical processes could start in this layer and change quality of infiltrated water. However, due to flow concentration in the epikarst, water and contaminants, as well as different types of organic and inorganic particles and colloids, can also be detached and transported downward to the active conduit network of aquifer. Therefore, a tracer experiment, along with monitoring of rainfall (snowmelt) events, was used to examine circulation of solutes between the land surface and water outlets (drops and trickles) into a shallow cave in the eastern part of Suva Planina Mt., in the eastern Serbia. The nearly horizontal cave named Peč is developed in Upper Jurassic (Tithonian) limestone, beneath soil-mantled convex hillslope with thickets of beech and hornbeam. About 0.1 to 0.3 m of soil and 3.5-12 m of karstified limestone (plus epikarst) overlie the 20.5 m long cave, with smaller and inaccessible 4.5 m long sub-horizontal channel in the end. The study of the epikarst (Peč cave) consisted of two elements: a short-term (transient) tracer experiment (artificial tracer) and a short-term experiment with “light” contaminant – manure (“natural” tracers). This article will be focused on the artificial tracer (Uranine) experiment. Several outlets from fractures at the cave roof, where water in form of drops and trickles appears were monitored and sampled. To study the response of the unsaturated zone to natural rainfall (snowmelt) events, discharge, temperature and electrical conductivity (EC) were monitored as well. Discharge was measured by collecting water from fractures in plastic pots and its summation in the selected periods of time. Temperature and EC were monitored using a conductivity probe (WTW -Cond 340i/set). Tracer experiment had a twofold goal: characterizing the flow conditions in the epikarst and studying solute transport. A quantity of 10 litre solution (50 g uranine) was released, with pouring of additional 80 l of water on the selected point above cave. Sampling of percolated water (collected in the pots on 10 locations) have been started few hours before pouring of tracer, and continued for next 6 days, in appropriate time periods. Samples were compared to previously prepared standards by using of field UV illumination set intending to confirm presence of tracer. Afterward, all collected samples were analysed in the laboratory (10AU Field and Laboratory Fluorometer, Turner Design) and precise concentration of tracer were obtained. The virtual velocity of the circulating water through the layer of epikarst and karstified limestone, was calculated = 0.0041 m/s to 0.006 m/s. Quantitative analysis of tracing experiments showed that about 3.5% of tracer yielded during experiment. The reason for small amount of tracer recovery can be found in the partial adsorption of tracer on soil particles (terra rosa or clay minerals) and some hydraulic reasons. Breakthrough curves of the dye tracer showed existence of three types of fissures/fractures differing in their hydrogeological function resulting mainly from the aperture width, and it is based on the different types of water flow occurring in the unsaturated (epikarst) zone: 1) large fracture – drains; 2) medium fracture; 3) small fissures. Furthermore, the result of the dye tracing experiment at Peč cave, showed that the epikarst behaves like a semipermeable membrane, which retains some water and substance, but then releases it in the next "moment". “The moment of detachment” can be immediately after next wave of water as well as few hours or days later.

Key words: epikarst, tracer test, shallow cave, Suva Planina Mt., Serbia