6.3.3.2. The Fourth Tracing Experiment in Autumn 1995
(M. ZUPAN)

The last tracing experiment in the framework of the program was performed during prevailing low water condition. It was a repetition of the tracing experiment in spring 1994 (Chapter 6.3.3.1) with the injection of pyranine to the Lokva stream below the Predjama castle. Additional a second injection point was chosen on the central Nanos Plateau, the pothole Slapenski ledenik (Chapter 2.5) to get information about the vertical water flow from Nanos towards the Vipava springs. Here uranine was injected (Tab. 6.1).

Pyranine

Astonishingly, the dye tracer pyranine was not at all detected. One possibility could be a dramatic change in the hydrogeological situation, respectively in the flow directions, in the catchment area of the Vipava depending on the hydrologic situation. While by prevailing high water conditions the water from the sinking stream Lokva is directed more or less directly to the Vipava spring as proved by a recovery rate of about 74 % in spring 1994 (compare Chapter 6.3.3.1), the flow direction during low water conditions as in autumn 1995 could change towards Timava. Hence no sampling was carried out which could prove this hypothesis, it is still pure speculation. Beside the hydrogeological conditions of the catchment area the various possibilities of biological, chemical or photochemical decay, which can destroy completely pyranine (KÄss 1992), have to be taken into account. The tracer amount injected was with 8 kg pyranine almost in the same range as in spring 1994 (7 kg uranine), when dilution was higher due to the high water conditions. Therefore a high dilution of the tracer pyranine below detection limit can be excluded.

Uranine

Uranine appeared in all three Vipava springs, which were chosen for the observation. The times of the first uranine appearing and the time of the maximal concentration are close together (Tab. 6.15). The concentration curves of the Vipava 4/2 (Fig. 6.28) and 4/5 (Fig. 6.29) are very similar, while the curve of the Vipava 4/7 (Fig. 6.30) is periodical different. These results prove once more the assumption that the various Vipava springs have different catchment areas, which are influenced by the hydrologic condition.

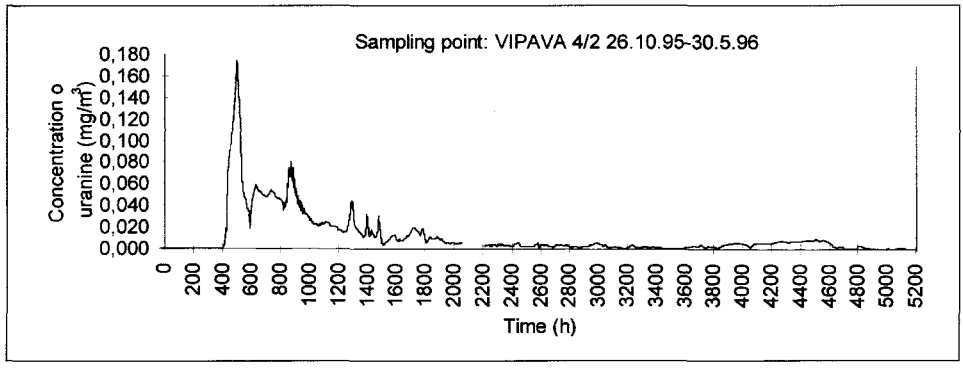

Fig. 6.28: Fourth experiment, October 1995: The concentration curve of uranine in the spring Vipava 4/2.

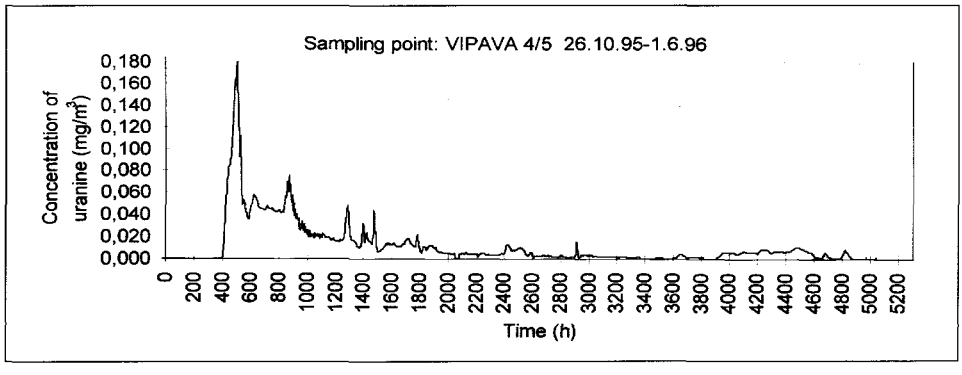

Fig. 6.29: Fourth experiment, October 1995: The concentration curve of uranine in the spring Vipava 4/5

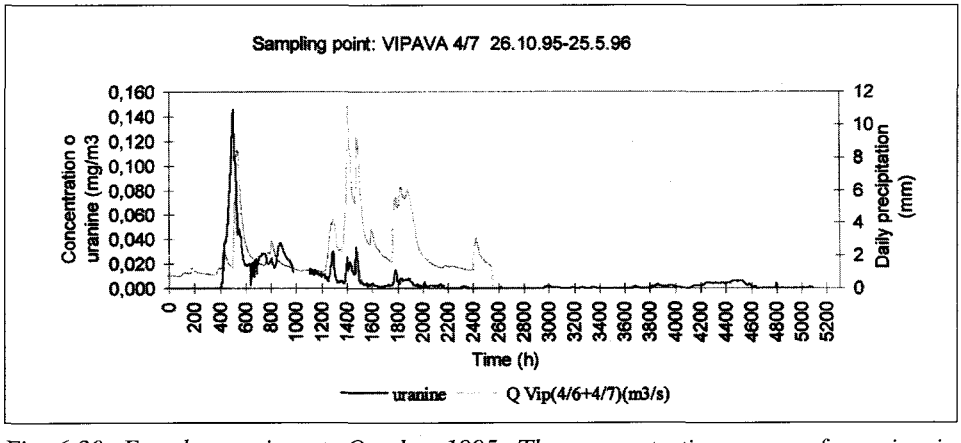

Fig. 6.30: Fourth experiment, October 1995: The concentration curve of uranine in the spring Vipava 4/7 and the join discharge of the Vipava 4/6 and 4/7.

Tab. 6.15: Overview of relevant parameters derived from the uranine breakthrough in the Vipava springs 5/5 and 4/7 in the fourth tracing test in autumn 1995 (injection into the pothole Slapenski ledenik, Oct 10, 1995): time(t_{max}), concentration (C) and velocity (v_{max}) of the first appearance, time of maximal concentration (t_{max}), maximal concentration (C_{max}) and dominant velocity (v_{dom}) in the springs and the recovery (R).

Spring	C [mg/m^3]	t_{max} [h]	v_{max} [m/h]	C_{max} [mg/m^3]	t_{dom} [h]	v_{dom} [m/h]	R [kg]	R [%]
Vipava-4/5	0,0015	406	19,7	0,1794	502	15,9	1,412*1)	28,2
Vipava-4/7	0,0011	405	19,7	0,1457	503	15,9	0,233*2)	4,66

+1) = recovery rate calculated for 4/1 and 4/5
+2) = recovery rate calculated for 4/6 and 4/7

6.3.4. The decomposition of tracers in the spring waters

(M. ZUPAN)

The decomposition of the uranine is different in different types of water (BEHRENS & ZUPAN 1976; ZUPAN 1991). To estimate this characteristic the analyses of limited number of samples taken in spring Hubelj and Vipava was repeated. The concentration of uranine in the samples taken in the spring Hubelj from October 22, 1993, till October 30, 1993, was determined for the first time from October, 28 till November 16, 1993. We repeated the uranine analysis in 89 of the mentioned samples in February 1994. The differences between the two determinations were in the interval of analytical repeatability and the concentrations of the second determination were practically the same as of the first one.

During the 4th tracing experiment (compare Chapter 6.3.3.2) we stored consecutive samples of the spring Vipava one in a glass flask and the second in a plastic flask. The samples in the glass flasks were analysed in maximal 10 days after sampling. Because of the lack of the time, the samples stored in the plastic flasks were analysed not before January, 25, 1995. The measured concentration of uranine in the consecutive samples was significant lower in the samples stored in plastic flasks then the concentration of the samples stored in the glass flasks. The difference between two consecutive samples decreased 15 to 100 % and in the next sample stored in the glass flask