4.2. OBSERVATION OF SINGLE EVENTS

4.2.1. Daily sampling in the springs Hubelj, Vipava and Mrzlek (M. ZUPAN)

Tab. 4.3: The summary of the daily sampling in the springs Vipava and Hubelj in the investigation period from 18-09-95 to 29-02-96.

THE SPRING HUBELJ

Parameter	Number of samples	Minimum value	Maximum value	Mean value	Standard deviation
Conductivity - µS/cm - 25° C	134	118	237	216	12.3
pH	134	7.8	8.5	8.2	0.16
Calcium	134	29.8	43.3	37.9	2.5
Magnesium	134	4.0	9.3	6.9	1.2
Sodium	134	0.2	2.1	0.9	0.25
Potassium	134	0.1	0.3	0.2	0.04
Nitrate	134	4.5	8.6	5.6	0.51
Sulphate	134	5.8	16.4	9.3	1.8
Chloride	134	1.2	2.5	1.9	0.23

THE SPRING VIPAVA 4/2

Parameter	Number of samples	Minimum value	Maximum value	Mean value	Standard deviation
Conductivity - µS/cm - 25° C	169	233	386	274	195
pH	169	7.7	8.5	8.1	0.16
Calcium	169	30.3	67.2	55.8	4.8
Magnesium	169	1.7	6.6	3.5	0.92
Sodium	169	0.9	2.4	1.4	0.28
Potassium	169	0.2	3.3	0.5	0.62
Nitrate	169	2.8	9.1	6.5	1.1
Sulphate	156	7.2	16.9	11.0	1.9
Chloride	169	1.5	3.1	2.1	0.30

In the time period from September 1995 to February 1996 daily samples in the springs Hubelj, Vipava and Mrzlek have been taken. From September 1996 to February 1997 we had taken the daily samples in the spring Vipava 4/2 (Fig. 4.12). The purpose of this sampling was to follow the changes in shorter time period and to define the changes of physical and chemical parameters depending on the water quantity more detailed. At the same time we wanted to compare the results of long-term weekly observations during three years with the results of daily sampling in much shorter period of time. The results of these observations are shown in the Tab. 4.3 and Fig. 4.16, 4.17 and 4.18. The distribution of the results of daily sampling in six-month period is very similar to those of weekly sampling. It means that we could get the information in much shorter time if we would sample with higher sampling frequency. The calculation of one-month daily samples did not give enough reliable information.

In the first period of sampling for the 3rd tracing experiment (Chapter 6) we took the daily samples for physical chemical analyses in the spring Mrzlek both on the right bank of the Soča and in the pump station for water supply. The daily samples we took from August 9, 1995 to August 17, 1995 and from August 30, 1995 to September 23,1995. Afterwards we continued with weekly sampling till December 12, 1995. The data should give us some information

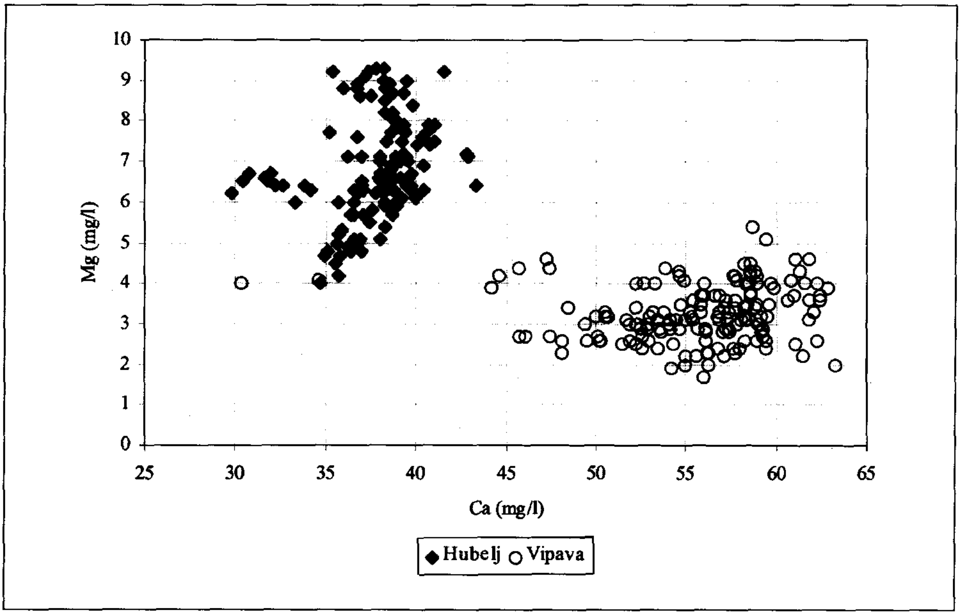

Fig. 4.16: Calcium and magnesium concentrations in the Hubelj and Vipava (4/2) spring; analyses from all daily samples during the investigation period.

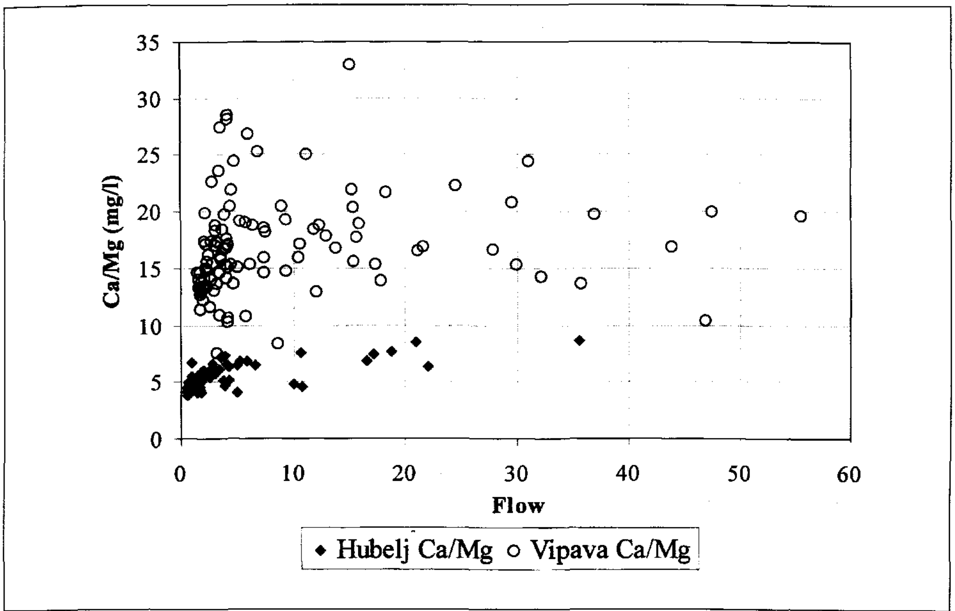

Fig. 4.17: Measured Ca/Mg ratios versus discharge in the Hubelj and Vipava (4/2) spring; analyses from all daily samples during the investigation period.

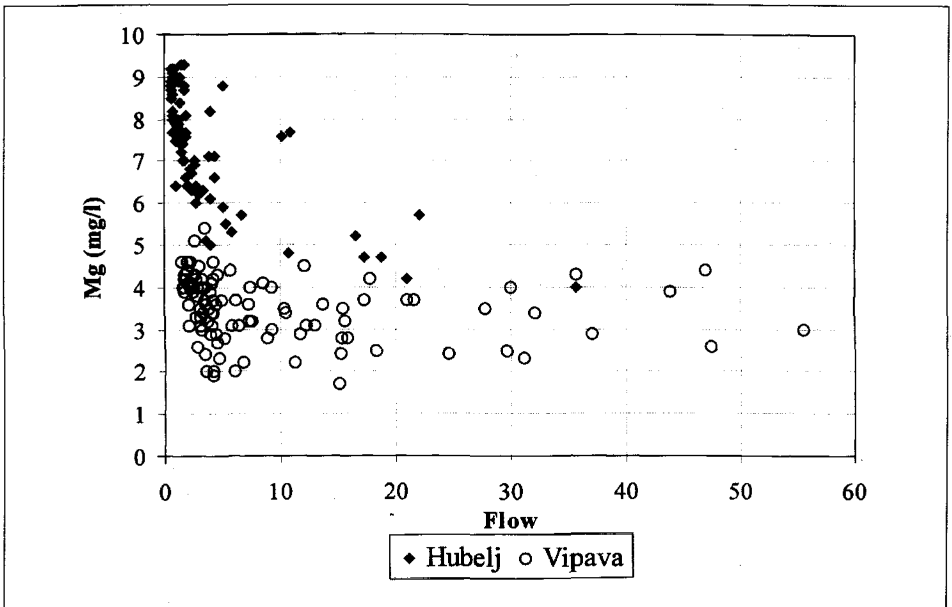

Fig. 4.18: Analysed Mg concentrations versus discharge in the Hubelj and Vipava (4/2) spring; analyses from all daily samples during the investigation period.

about the influence of the Soča to the Mrzlek spring on both sampling sites. During the dry period in the beginning of August the magnesium concentration in the pump station was higher than in the spring while the calcium concentration was lower in the pump station. This fact would allow us to presume that some influence of the Soča river to the spring exist (Fig. 4.19). Namely the magnesium concentration is significant higher in the Soča while the calcium concentration is lower. Mean concentration of magnesium in the

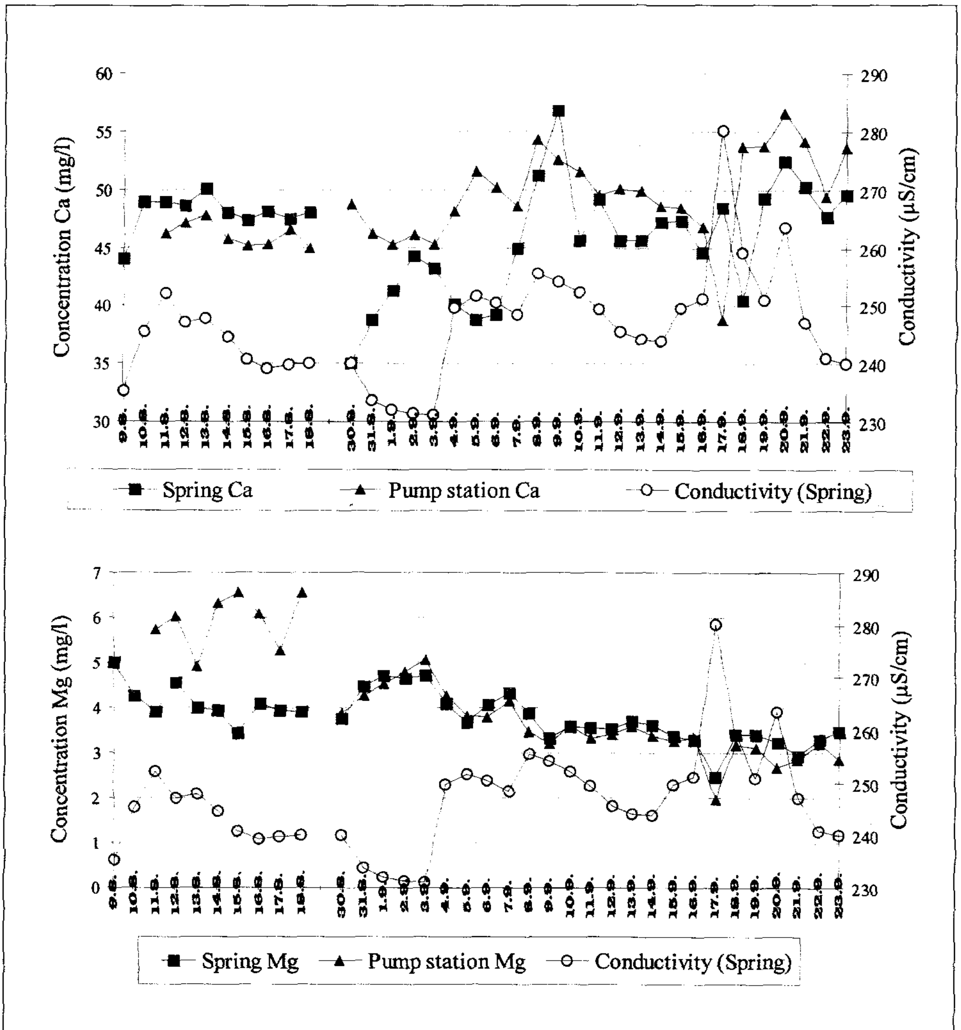

Fig. 4.19: Conductivity and calcium concentration (above) and conductivity and magnesium concentrations (below) in the Mrzlek spring and in the pump station, analyses from all daily samples during the investigation period.

Soča during the daily sampling period was 10.6 mg/l while in the Mrzlek it was 3.9 mg/l. Mean calcium concentration in the same period of time was in the Soča 43.3 mg/l and in the Mrzlek 48.4 mg/l. In September during rainy period the magnesium concentration was very similar in both sampling points while the calcium concentration was much different.

The seasonal model showed the catchment area of the Hubelj is not changing much at different hydrological conditions. The catchment area of the Vipava seems to be more changeable at different hydrological conditions.

The hydrochemical analyses of weekly samples in the period of three years and the analyses of daily samples taken during six-month period gave very similar characteristics. The results of the weekly sampling during one year period would be satisfactory as well.

4.2.2. Water pulse of the Vipava spring - Pod Lipo 4/2

(J. KOGOVŠEK)

After a medium-sized water pulse in the second half of September the Vipava discharge was decreasing through the whole of October. On November 11, 1995 the discharge increased (the occurrence of the first water pulse) and reached its maximum of 9.6 cubic meters two days later. During the following two days it decreased to a half. On the next day, November 16, the discharge increased again and reached its maximal value of 51.9 cubic meters on November 17, 1995 at 3 p.m., thus forming the second water pulse (see Fig. 4.20). In this time we manually sampled Vipava at the spring Pod Lipo, No. 4/2 for physico-chemical analyses. We measured the temperature, specific electric conductivity and pH and we determined carbonate, calcium and total hardness, and chloride, sulfate, nitrate and phosphate levels.

During the first, smaller, water pulse a slight increase of carbonates, calcium and SEC was recorded, probably due to replacement of old water from a recharge area, for there was no considerable change in discharge in the last 45 days. The second water pulse was followed by a rapid increase reaching the maximal value of discharge in 27 hours. The first sample was taken 7 hours after the minimal discharge at the beginning of water pulse when the discharge reached twice the minimum. The carbonate and calcium levels were lower by 0.3 meq/l than at the first lower water pulse. Unfortunately we did not sample in the intermediate time between the two water pulses.

The discharge increase in the second wave was followed by a slight increase of carbonates and calcium, but when the maximal discharge rapidly decreased they decreased also. Later, when the discharge decrease was slower the hardnesses were in slight increase (Fig. 4.20). Minor deviation was recorded in calcium level, as at the initial decrease its concentration decreased slightly less and during continuing slower discharge decrease remained higher compared to