4.1.4. Comparative measurements of the Vipava springs

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In the years 1964, 1965 and 1979 HABIČ (1983) already made the comparative measurements in the several Vipava springs (Fig. 4.12) when he compared the temperature and carbonate levels. Based on five series of measurements in March, May, June, November and December he stated that the southernmost springs Pod Lipo and Pri Kapelici are the most warm, 0.1 to 1.3° C warmer than other Vipava springs, and that the variations in temperature of all the Vipava springs do not exceed 1,5° C during a year.

Repeated measurements and analyses in the Vipava springs were done within the 7. SWT project. At the time of low and lowest waters we measured at all the seven springs of the Vipava their temperature, specific electric conductivity, pH and we analyzed total hardness and carbonate, calcium,

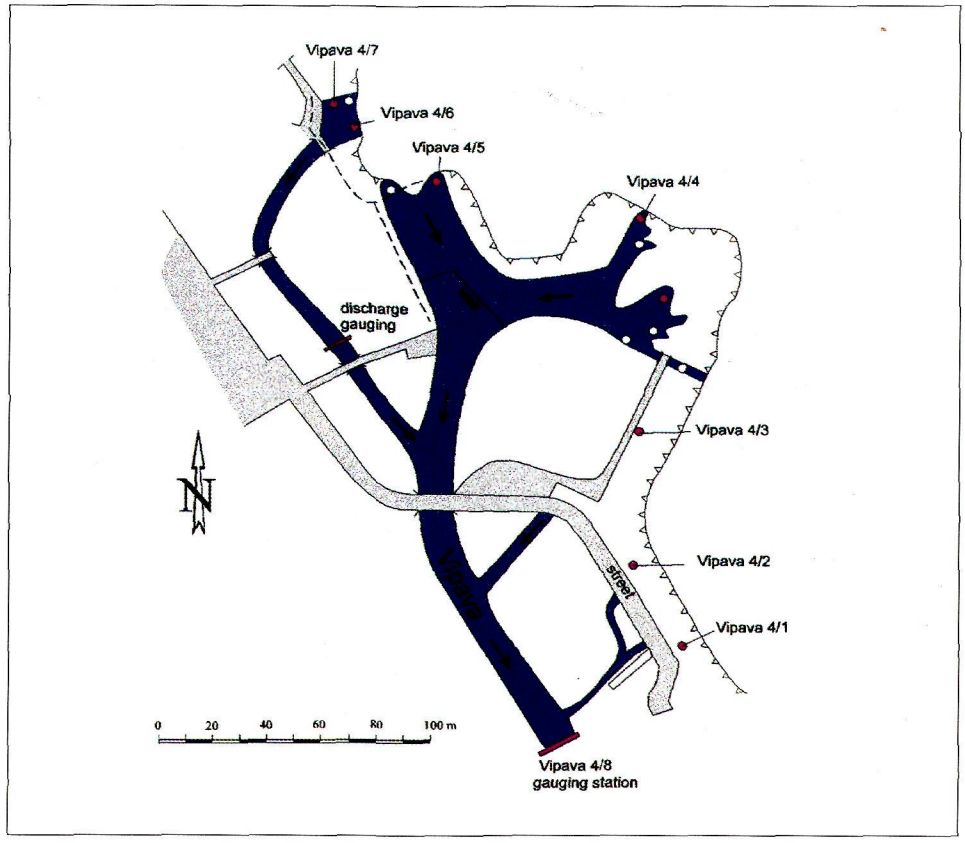

Fig. 4.12: Sampling points at the Vipava spring group (map after IHG).

chloride, nitrate and sulfate levels to find out the differences or similarities. The measurements and samplings took place on July 28 and December 2, 1994, May 25, 1995 and June 3 and September 16, 1996.

The measured parameters of the spring Pod Farovžem Levo 4/7 differ considerably from the others where the differences are smaller. It reached the highest values of the specific electric conductivity (the average value was 361 μS/cm), the highest total hardness (the average value was 3.82 meq/l), and

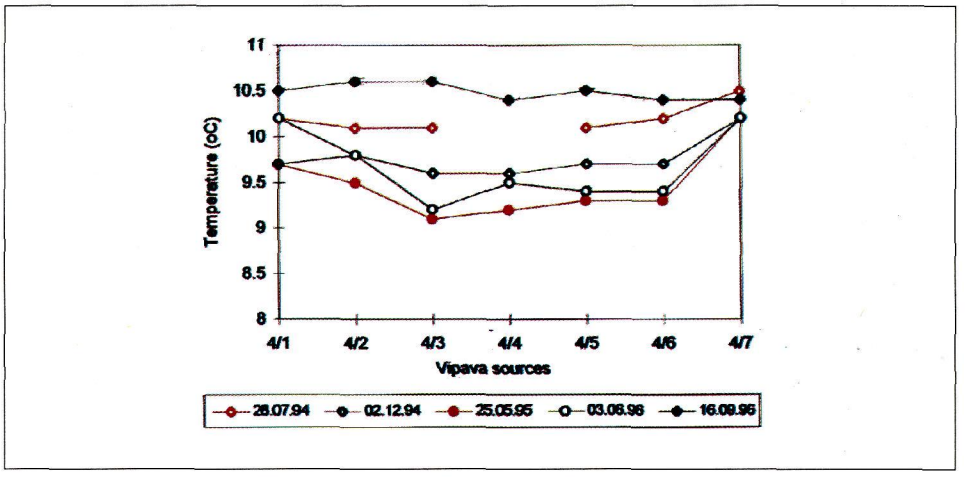

Fig. 4.13: Temperature variations in the Vipava springs at low and lowest water level.

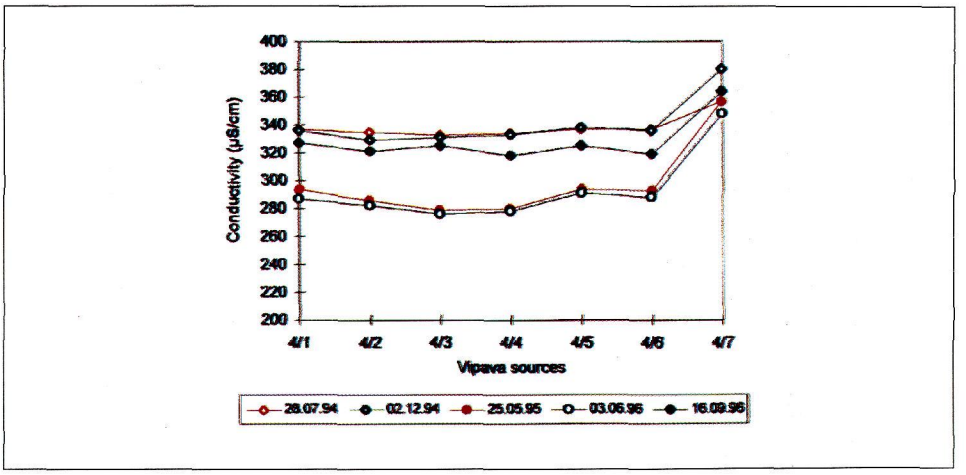

Fig. 4.14: Variations in the specific electric conductivity in the Vipava springs at low and lowest water level.

also the highest levels of carbonate and calcium as well nitrate and sulfate. At other springs only smaller differences were perceived. Compared with the spring 4/7 they have an average a 55 µS/cm lower SEC, and 0.6 meq/l lower carbonate and calcium levels and total hardness.

Regarding the temperature (Fig. 4.13) the spring 4/7 is very constant during a year. During mentioned measurements we recorded the temperature as always between 10.2 to 10.5° C. The temperature of other springs varies over the year by up to 1.5° C. In the observation time the temperatures of all the springs, with exception of 4/7, varied by from 0.2 to 0.3° C. Only in spring time when snow melts in the catchment area of high Nanos Mt. (measurements in May and June) the springs Pri Kapelici 4/1 and Pod Lipo 4/2 had higher temperatures (0.5 to 1,0° C) than the average temperature of other springs. This confirms the Habič's supposition that these springs are locally more influenced by sunny slopes of Nanos.

Also other measured parameters indicate smaller variations at the spring 4/7 than at the others. SEC varied by 32 µS/cm, while at the others by 51 µS/cm (Fig. 4.14). Yet the differences between the springs, with exception of the spring 4/7, in the observed time are very small, up to 9 µS/cm; the exceptional ones are the measurements of May and June when the range of difference is 15 µS/cm.

The carbonate and calcium level varied at the spring 4/7 by 0.2 meq/l while at the other springs it was more than 0.4 meq/l. The total hardness oscillated at the spring 4/7 in an interval of 0.4 meq/l while at others springs it was 0.6 meq/l (Fig 4.15). There are considerably lower values of SEC, and also of carbonate and calcium levels in spring time, and higher values at the end of summer and in autumn indicating seasonal variations.

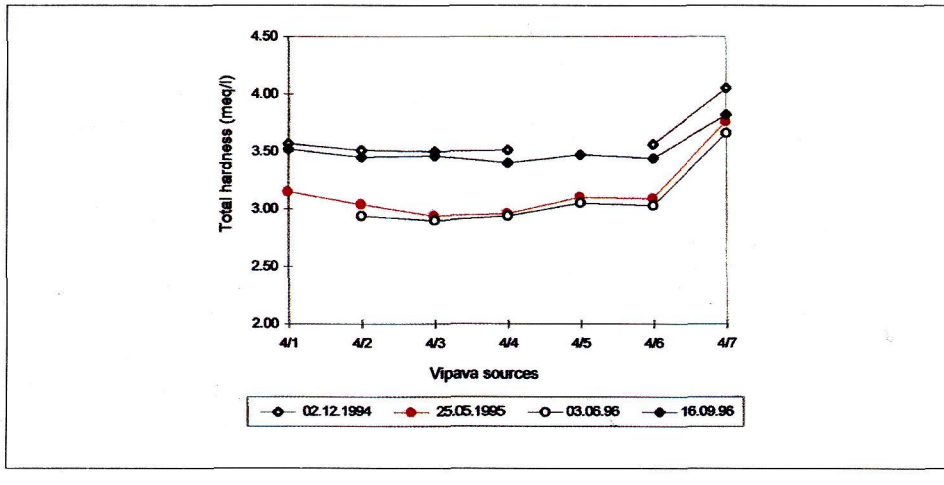

Fig. 4.15: Variations in the total hardness in the Vipava springs during low and lowest water level.