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QUALITY OF GROUNDWATER IN WESTERN THESSALY THE PROBLEM OF NITRATE POLLUTION

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In this study are presented the results of a research about the quality of groundwater in the western Thessaly that was carried out by the Laboratory of Environmental Chemistry of the University of Athens during the period 2001-2002.

The study included two samplings during May and August of 2002. In May the water table is at high level due to the winter and early spring rainfalls, while at the end of summer the level of the water table is as low as it can be due to the use of very large amounts of water for irrigation. Fourteen samples stations were selected and the samples were received from deep (80 – 100 m) wells.

The following chemical parameters were determined: pH, conductivity, temperature, total hardness, Ca, Mg, Na, K, Fe, Cl^-, NO_3^-, NO_2^-, PO_4^{3-}, NH_3, total P, CO_3^{2-} – HCO_3^-, Cd, Cu, Pb and Zn. UV-Vis Spectrometry, Flame and Flameless Atomic Absorption Spectrometry and Flame Emission Spectrometry were used for the chemical analyses. The spatial distribution of these parameters was studied as well as the correlations among them.

The groundwater of province Farsala has found to contain high concentrations of calcium, nitrites, bicarbonates and very high concentrations of nitrates. The increased value of nitrates in groundwater is a major problem in Greece, because of the fertilizers that are used to in the most areas with intensive agriculture. The Pipper's diagram classifies the groundwater at the Ca - HCO_3^--type.

The heavy metals are very low and they do not have any toxic effects. The ionic ratios (Ca+Mg)/(Na+K) and Na/K show that there is constant flow and the ratio Ca/Mg shows that the groundwater originate mostly from calcareous aquifers and less from siliceous aquifers.

The classification according to the conductivity, the chloride concentration and the degree of alkalinity characterizes the groundwater as water of medium quality that can be used for irrigation at soils with good conditions of leaching, except the water of one sampling station.

Key words: groundwater, nitrate pollution, Thessaly