

HYDROLOGEOLOGY OF THE AREUSE DELTA PLAIN WATER QUALITY CARTOGRAPHY AND THE STUDY OF THE SPACE-TIME EVOLUTION

ABSTRACT

The object of this report is the study of the physico-chemical parameters of the phreatic aquifer of the Areuse delta. The quality of this water is deteriorated due to the excessive and uncontrolled use of chemical fertilizers.

To complete the surveillance network already in place an additional seven piezometers were installed to continuously observe water levels and the physico-chemical parameters of the phreatic aquifer.

The aquifer consists of sandy gravel with a 20 m average thickness. The aquifer is covered by soil vegetation and silty sand. The substratum is generally a silty-clay. The aquifer displays lithological heterogeneity and its deltaic structure is complex.

Areas of high permeability are located in the centre, south, east and west of the delta. The geometry and lithology of the aquifer was determined by geophysical prospection (VLF Electromagnetic methods), and through the study of the lithostratigraphic logs of the wells and piezometers.

The water table is inclined towards the lake which constitutes its base level.

The region in close proximity to the Areuse river is marked by a zone of depleted mineralisation due to dilution from the river.

The waters of the plain are calcite-bicarbonated and magnesium, poor in sodium and sulphates. A map of the nitrate values reveals that lower concentrations are located in the south and north while in the east the concentrations are high (40 mg/l). High concentrations in chloride are found in the centre of the plain (20 mg/l).

Water quality studies from the years 1978, 1981, 1982 and 1989 has permitted use to note the following :

- Prior to 1978 a decrease in water quality was noted.
- Post 1980, corresponding to the prohibiting of waste mud spreading on the delta, a net improvement in the water quality was observed.

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KEY WORDS

Areuse Delta, Areuse, VLF, Cartography, Hydrochemistry.