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Free groundwater of the Areuse Delta (Switzerland): Hydrogeology and recharge

Abstract

The chosen position for the experimental site is situated on the northern edge of the Areuse (NE) delta. The identification of the aquifer of the Areuse delta and its geometry was obtained from several geophysical studies, of which the last is presented here.

The free groundwater of the Areuse plain constitutes an important water reserve. A study of the quality of its water between 1954 and 1978 showed deterioration in the sanitary state, giving rise to the prohibition of waste mud spreading on the Areuse plain. Since then there has been a slight improvement in the water quality, confirmed by nitrate mapping of the area.

The experimental well was situated at the base of a geophysical prospecting. The meteorological conditions and the level of the aquifer were recorded. At the same time, a weekly measurement of the humidity at every level of the non-saturated zone was made, and a suction profile produced.

These measurements allowed the establishment of a moisture balance after use of an empirical calculation for the evapotranspiration (Primault's law), and also allowed the calculation of weekly charge gradients. These confirmed the results obtained from the moisture balance.

Also, the level of the aquifer was compared to that of the nearby lake and the rainfall. No correlation was found between them. However, the level of the lake is perfectly correlated to the level of the aquifer, showing that the influence of the direct recharging by the non-saturated zone is marked by the major influence of the lake level.

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