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# Optimization of hydrogeological parameters of riverbank filtrated aquifers of the Szendendre Island using natural tracers

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Hungary's capital, Budapest, and a number of surrounding settlements are supplied with drinking water largely from the bank filtered aquifer at Szentendre Island of the Danube River lying to the north of the city. Precise knowledge of regional hydrogeological processes in riverbank filtrated aquifers are indispensable for aquifer protection and adequate quality water supply. To reach this goal, the origin and velocity/transit time of filtrating water was studied: stable isotopic, e.g. O-18 tracing measurement. Basis of these studies was the fact that d18O of Danube water (-10.9 % as a mean) differs from the locally infiltrated precipitation (shallow groundwater, -9,5 %) as a consequence of the „altitude effect".

Szentendre Island itself sits mainly on Tertiary marine clayey sediments. These are topped by gravels and sands of Pleistocene age. Surface formations consist of semi-consolidated shifting sands and a few floodplain horizons.

Widespread gravel formations on the island provide the basis for one of the largest volumes of abstraction of riparian-water in Europe. Supplied water comes largely from the river, and is supplemented by locally infiltrated precipitation. While filtrating from the watercourse through porous sediments to the wells, water is cleared from physical as well as biological contaminations.

Water samples were taken on a daily basis from the Vác arm of the Danube, as well as from the water producing Kisoroszi-2 horizontal collector well, lying at the bank of Danube on the Szentendre Island. Collectors of this well are aligned to two horizons at the depth of ca. 12 m in the Pleistocene gravels. Electric conductivity, temperature and pH were measured daily, and were supplemented by d18O measurements for characterizing the region between the Danube and the well.

To study larger scale systems, at first three, then six monitoring wells were sampled for the parameters stated above. These wells are aligned along a line connecting the two river arms around the island, thus provide information about the inner parts of the island.

Highest conductivity and d18O values for monitoring wells were expected in the central part of the island. However, one of the marginal wells proved to show the highest measured values, suggesting extraordinary behavior of the local flow regime.

Anomalous behavior of conductivity and oxygen isotopic values (both higher in the Danube than in the collector well) were detected, indicating conditions different from that to be predicted by a simple conceptual model. In accordance with seasonal variations during the test period, river temperature fell almost 8 ºC, while well temperature increased linearly about 1.4 °C. These values suggest more complicated flow/storage conditions.