$^{3}H/^{3}HE$ APPARENT AGES OF ARTIFICIAL TRITIUM IN THE GROUNDWATER TO QUANTIFY FLOW VELOCITIES AROUND PAKS NPP

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Our previous studies have shown that the mean groudwater flow direction is always towards to the River Danube, while the exact direction and velocity are controlled by the river water level an additionaly the distribution of surface waters such as cold water channel and fishery lakes around the plant. The hydrological flow and transport models of us are calibrated by means of groundwater level time serious. The scope of the project is to make the transport model more accurate and to understand the processes of the local shallow groundwater system. This is based on the age calculation of the tritium contamination of the groundwater. Uncontrolled artificial tritium discharge from the power plant has increased the tritium contentration of the groundwater in the close vicinity of the nuclear power plant to about 50-300 Bq/l. We have initiated to use this tritium plume for $^{3}H/^{3}He$ dating. We estimate to get groundwater residence times in many monitoring wells with a precision of better than a few months. This precision allows us to tune the groundwater flow model to provide more accurate predicitions. Additionally, if we assume the discharging water has an initial atmospheric $^{3}He/^{4}He$ ratio, we can estimate the date of uncontrolled artificial release of tritium from the power plant. The presentation will show the principles of $^{3}H/^{3}He$ dating, the used approximate assumptions, the calculated apparent water ages, and the relationship between model calculations and water ages.