



Implementation of the EU-Water Framework Directive: “Groundwater Ages” and Pollution close to Vienna, Austria

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According to the European Water frame Directive it is a requirement that surface and groundwater in the EU should be back to quality good conditions by 2015. For the implementation of this goal it is necessary that any measures to improve groundwater quality show an impact within the upcoming 10 years. A prerequisite for any change of groundwater chemistry within this time frame is that the mean residence times of the groundwater body is shorter than 10 years.

The groundwater body Marchfeld as area of investigation is located in Austria east of Vienna. The Marchfeld is a 1000 square kilometre large area, with an intensive agricultural use and partly strong urbanisation.

This region is one of the largest pore-groundwater bodies in Austria. Since the area is distinctively agricultural used the groundwater contains high concentrations of nitrate and pesticides and shows other hydrochemical changes in the aquifer consisting of 20 – 90 m of fluvial gravel and sands.

Since 1992 the Austrian Environment Agency (Umweltbundesamt) collects data in the Marchfeld from the Austrian hydrochemical groundwater monitoring system.

The aim of this project is to investigate whether it is possible to see improvement in the groundwater of the Marchfeld region according to the European Water Directive

until 2015.

Since 2005 hydrochemical monitoring in this region is supported by intensive investigations of oxygen-18 and tritium analyses in order to trace groundwater circulations and to calculate model ages of the mean transfer time at the monitoring wells. In addition, these model ages are evaluated by CFC and $^3\text{H}/^3\text{He}$ -dating methods in depth controlled groundwater samples at selected wells.

The scope of this project is to interpret the spatial and temporal variability of hydrochemical parameters. This is tested by applying multivariate geostatistic, cluster analysis and time series analysis and correlation of these results with isotope hydrological age information. The isotope hydrological investigations will be carried out in cooperation with the International Atomic Energy Agency (IAEA).