



Dating of young groundwater in nine porous aquifers in Alpine Basins by ^{18}O , ^{3}H , $^{3}\text{H}/^{3}\text{He}$, CFC and SF6

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The European Water Framework Directive requires the surface and groundwater bodies in the EU to be back to good quality 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 5 years.

The investigated groundwater bodies are distributed all over Austria and range in size between 160 - 1000 km². The thickness of the aquifers varies 2 – 110m. The nine groundwater bodies are distributed all over the Eastern Alps from the Upper Rhine valley to the Vienna-area at the Austrian – Hungarian border. Most of them are under intensive agricultural use and consist of fluvial gravel and sands. Due to the extensive agricultural use it contains high concentrations of nitrate and pesticides and shows other hydrochemical changes caused by urbanisation and industrial use. In more than 100 monitoring wells delta oxygen-18 was analysed four times during one year within the framework of the Austrian hydrochemical groundwater monitoring system. During one campaign ^{3}H , $^{3}\text{H}/^{3}\text{He}$, CFCs and SF₆ was analysed in all wells. In addition, the same methods were applied on depth-resolved groundwater samples at selected wells.

The first results support the rapid water circulation in the inner-Alpine basins whereas the basins at eastern end of the Alps within the Pannonic climate zone show transport times of decades for the uppermost aquifer.

However, the fluvial sediments are partly very heterogeneous and the mean residence time (MRT) can vary considerably from well to well in range of less than half a year to more than 50 years. The depth resolved groundwater samples indicate in most cases an increase of MRT with depth.