



Sources and transformations of nitrates in an polluted catchment: the isotope perspective

Przemysław Wachniew, Damian Zieba, and Kazimierz Rozanski
AGH University of Science and Technology, Kraków, Poland (wachniew@agh.edu.pl)

The temperate catchment of the Kocinka river (surface area of 260 km²) in Poland is connected with an important karstic aquifer polluted with nitrates. The question of the origin (agricultural vs wastewater) and pathways of this pollution is a subject of intensive research. Observations of the stable isotope compositions of hydrogen and oxygen in groundwater and surface water performed at different hydrological conditions provide information on spatiotemporal patterns of groundwater inflows into the river system. Stable isotope signatures of river water show the increasing downstream contribution of groundwater in river flow and its domination at low flow periods. Observations of the stable isotope compositions of nitrogen and oxygen in nitrates show that natural denitrification both in the groundwater and surface water has a limited influence on nitrate behaviour in this coupled hydrological system. Stable isotope techniques provide in this case important insights with respect to management of groundwater resources and the improvement of the water quality in the catchment.