



## **Pesticides and biocides in a karst catchment: Identification of contaminant sources and related flow components**

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Karst aquifers are widely used as drinking water resources. However, their high vulnerability to chemical and bacterial contamination due to the heterogeneity in aquifer properties (highly conductive solution conduits embedded in the less conductive fissured rock) is difficult to assess and thus poses major challenges to the management of karst water resources. Contamination of karst springs by organic micro-pollutants has been observed in recent studies. Within this study the water from different springs draining one karst aquifer as well as the main sinking stream replenishing it were analysed before, during and after a storm water event in order to examine the occurrence of different pesticides and biocides. Contaminants from both urban as well as agricultural origin could be detected in the water with concentrations in the low ng/L range (tebuconazole, carbendazim, diuron, isoproturon, terbutryn, atrazine, dichlorobenzamide (BAM), which is a metabolite of dichlobenil). While some compounds could be followed from the sinking stream to the springs (e.g. dichlorobenzamide) some seem to have a source in the autogenic recharge from the karst plateau (Tebuconazole: wood preservative in buildings). These compounds appear to be related to fast flow components with residence times in the order of days, which are known from a number of tracer tests with fluorescent dyes. However, the occurrence of the pesticide atrazine (banned since 1995 in Austria) in the springs, while on the other hand no current input into the karst occurs, shows that some compounds have long residence times in the karst aquifer. These differences in residence times can hardly be attributed to differences in physico-chemical properties of the compounds and must thus be due to the presence of slow and fast flow components. This is in agreement with the duality of karst aquifers due to highly conductive networks of solution conduits embedded in less conductive fissured carbonate rocks.