



Sources, distribution and mobility of polycyclic aromatic hydrocarbons and pesticides in soils from a small agricultural watershed (Normandy, Northern of France). Impact on the quality of groundwater resources.

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The survey of the underground drinking-water resource has become a worldwide priority as its quality is a powerful environmental determinant for public health concerns. In Haute Normandie (NW France), the chalk aquifer is an important karstic groundwater resource, particularly vulnerable to pollution from the surface. If up to now, there is no quantitative major challenge for groundwater in the region, agricultural / domestic activities and traffic frequently spoil its quality. In this study, a small agricultural watershed (The Varras, Haute Normandie) was chosen with the aim to identify the nature (pesticides and PAHs) and sources (agricultural or traffic exhausts) of some organic contaminants spread on agricultural soils. These contaminants associated with suspended particles are therefore rapidly driven from the surface to the ground water through the sinkholes. Contaminants being often adsorbed to fine particulate fractions as clay or organic matter (particulate or dissolved), granulometry was carried out on soils and recent sediments samples. The content and nature of the clay assemblage and particulate organic matter were also analyzed.

First, the adsorption capacity between dissolved and particulate phase in two size fractions ($<2\text{mm}$ and $<63\mu\text{m}$) was determined for diflufenican (Herbicide, Group: carboxamides). The choice of this pesticide resides in (i) its use over the last 10 years on the studied surfaces and (ii) its physicochemical properties such as its persistence in soil (DT50 typical: 542days and DT50 field: 315days) and its low water solubility (0.05 mg/l). Then, a series of preliminary analysis are performed with GC-MS coupling for identification and quantification of PAHs and pesticides. These analysis were realized at different soil depths (0-5; 5-10; 10-20; 20-30; 30-40 cm; and 0-40cm) and following different grain sizes ($<2\text{mm}$ and $<63\mu\text{m}$). In addition, different waters originated from highway and agricultural runoff and from piezometers (water infiltrated within the superficial deposits) were also studied. This characterization would be an indication of the potential risks of leaching and contamination of groundwater through sinkholes.