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# Modelling fate and transport of pesticides in river catchments with drinking water abstractions

Nele Desmet (1), Piet Seuntjens (1,2), and Kaatje Touchant (1)

(1) Flemish Institute for Technological Research (VITO), Land & Water Management, Mol, Belgium (nele.desmet@vito.be),
(2) Ghent University, Department of Soil Management and Soil Care, Ghent, Belgium

When drinking water is abstracted from surface water, the presence of pesticides may have a large impact on the purification costs. In order to respect imposed thresholds at points of drinking water abstraction in a river catchment, sustainable pesticide management strategies might be required in certain areas. To improve management strategies, a sound understanding of the emission routes, the transport, the environmental fate and the sources of pesticides is needed. However, pesticide monitoring data on which measures are founded, are generally scarce. Data scarcity hampers the interpretation and the decision making. In such a case, a modelling approach can be very useful as a tool to obtain complementary information. Modelling allows to take into account temporal and spatial variability in both discharges and concentrations.

In the Netherlands, the Meuse river is used for drinking water abstraction and the government imposes the European drinking water standard for individual pesticides (0.1 $\mu$g.L$^{-1}$) for surface waters at points of drinking water abstraction. The reported glyphosate concentrations in the Meuse river frequently exceed the standard and this enhances the request for targeted measures. In this study, a model for the Meuse river was developed to estimate the contribution of influxes at the Dutch-Belgian border on the concentration levels detected at the drinking water intake 250 km downstream and to assess the contribution of the tributaries to the glyphosate loads. The effects of glyphosate decay on environmental fate were considered as well.

Our results show that the application of a river model allows to asses fate and transport of pesticides in a catchment in spite of monitoring data scarcity. Furthermore, the model provides insight in the contribution of different sub basins to the pollution level. The modelling results indicate that the effect of local measures to reduce pesticides concentrations in the river at points of drinking water abstraction, might be limited due to dominant transboundary loads. This emphasizes the need for transboundary management strategies on a river catchment scale.