Geophysical Research Abstracts
Vol. 21, EGU2019-17147, 2019
EGU General Assembly 2019

Weather and field conditions as predictive factors of the risk of pesticide leaching to drain lines

Jeanne Vuaille

University of Copenhagen, Plant and Environmental Sciences, Environmental Chemistry and Physics, Denmark (jeannev@plen.ku.dk)

Pesticides applied on agricultural fields can reach the surrounding aquatic environment through drain lines, which can potentially cause ecotoxicological concerns. In particular, pesticide leaching through preferential flow paths in the soil is of high importance, because of the fast transport of pesticide from the soil surface to the drains it may induce. In addition, preferential flow paths are known to occur under specific weather and field conditions such as heavy rainfall and high soil water content. In this study, we therefore attempt to predict the risk of pesticide leaching to the drains using information about weather and field status.

Pesticide transport is simulated with the soil-plant-atmosphere system model Daisy for two Danish agricultural sites. A 3000-year period of stationary weather is used, generated based on 30 years of real weather. We focus on two weakly sorbing herbicides, typically used in cereal cultivation, which are applied every day within their corresponding application window. For each application day, we simulate the hourly concentration of active ingredients and metabolites in the drain water over one year after application. The Regulatory Acceptable Concentration (RAC) in a standardized receiving water body is used to quantify the ecotoxicological risk related to each application day.

Several variables describing both the past and near future weather and field conditions are subsequently selected as explanatory variables for the risk of pesticide leaching after each application day. For practical reasons, variables are considered relevant if relatively accessible to farmers. We first show the impact of the application day on the ecotoxicological risk. In a next step, we show that the selected variables can be used to build a model, which predicts the risk of leaching events from easily available information. Furthermore, the new model is shown capable of selecting an optimum application day with a significant lower risk in comparison to typical application days.