



Mapping Ground water Vulnerability to Pesticides Leaching with Process-based Metamodel of EuroPEARL: The Molignée catchment case, Belgium

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Diffuse pollution of water resources due to pesticide uses is a major environmental issue in the European Union, regulated by specific legislations: the Water Framework Directive (Directive 2000/60/EC) and the Thematic Strategy on the Sustainable Use of Pesticides. To support these EU policies, indicators of pesticide leaching, at the local scale (agricultural parcel level) and regional scale are required. This paper presents the use of a metamodel of the spatially distributed pesticide leaching model EuroPEARL [Tiktak et al., 2006] to assess pesticide leaching to Ground water in the Molignée Catchment (Belgian Condroz region). EuroPEARL considers transient flow and solute transport and assumes Freundlich adsorption, first-order degradation and passive plant uptake of pesticides in the soil-root system. The EuroPEARL metamodel is based on an analytical expression that describes the mass fraction of pesticide leached in terms of easy available and sensitive soil, climate, land use and pesticide properties. The input parameters of the metamodel are pesticides properties (degradation rate and organic matter-water partition coefficients), soil parameters (organic matter content, dry bulk density and volume fraction of water) and the volume flux of water (hydraulic parameter). These parameters are available in soil databases (Aardewerk and Réquasud) or are derived from pedotransfer functions. The digital soil map of Wallonia is used for the spatial representation, by using the fourteen (23 for the whole Wallonia) main soil types encountered in the catchment, as simulation units. Simulations were also carried out by taking into account four groups of pesticides with different properties (Focus, 2000). The quality of the results obtained will be assessed by comparing the spatial patterns of estimated pesticide leaching with data obtained from existing water monitoring stations.