



## **Mathematical modeling of pesticides in the vadose zone: application to the Júcar River Basin in Spain**

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Pesticide application has currently been identified as one of the most relevant soil contamination sources on agricultural areas. Understanding the fate and transport of pesticides in the vadose zone is critical to predict the impact assessment of agricultural activities over the soil.

This work shows the application of two different USEPA numerical models (PESTAN and PRZM-GW) to simulate the fate and transport of pesticides in the unsaturated zone of the aquifer.

PESTAN is used to estimate the vertical migration of dissolved organic solutes through the vadose zone to groundwater. Estimates are based on a closed-form analytical solution of the advective-dispersive-reactive transport equation. The model is intended for use in conducting initial screening assessments of the potential for contamination of ground-water from currently registered pesticides and those submitted for registration. The Pesticide Root Zone Model Groundwater (PRZM-GW) was developed as a regulatory model to estimate pesticide concentrations in vulnerable groundwater sources.

Both models have been applied to simulate the behavior of pesticides on the scope of the Júcar River Basin in the East of Spain for a set of different environmental scenarios.