



Transport of methabenzthiazuron in cropped lysimeters: model comparison and validation

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Models predicting flow and solute transport in the unsaturated zone differ in their conceptual approaches, their mathematical formulation and their complexity. The models MARTHE, TRACE, ANSWERS and MACRO, which are different in their degree of complexity and their model concepts, were applied to a common data set for the comparison and the evaluation of the different modeling approaches. Free draining lysimeters were used to experimentally determine actual evapotranspiration, soil moisture and drainage amount for 627 days. The lysimeters were cropped with winter wheat, barley and oat. One lysimeter was treated with methabenzthiazuron (MBT) and soil residues as well as leaching were monitored. The herbicide MBT has been commonly used for almost 30 years in Europe. For the modeling, the use of given model inputs was recommended, apart from calibrated plant parameters. The use of validation criteria proved a proper description of water flow for the four models. After calibration, the Richards equation based models perform better than the capacity based model. A small amount of observed macropore flow, not included in the model structures of MARTHE, TRACE and ANSWERS, did not influence the simulation of water flow significantly. Although the macropore flow was associated with a leaching of 0.0059 % of the applied mass of MBT, which causes relevant concentrations in the leachate. After calibration of soil hydraulic properties the leaching can be described with MACRO.