



Evaluation of the model structure and parameterisation of the FOOT-CRS tool

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In the EU-project FOOTPRINT three pesticide risk assessment and management tools were developed, for use by three distinct end-user communities at three different spatial scales: policy makers and registration authorities at the national/EU scale, water managers and local authorities at the catchment scale, and farmers and extension advisors at the farm scale.

In the catchment-scale tool FOOT-CRS, which has been programmed as an add-on in ArcGIS 9.3, the emphasis is on i) identifying the areas most contributing to the contamination of water resources by pesticides, and ii) defining and/or optimising action plans at the scale of the catchment. In contrast to the national-scale tool FOOT-NES, where pesticide concentrations in hypothetical edge-of-field surface water bodies are calculated, FOOT-CRS uses the actual surface water network. For the calculation of pesticide inputs into surface waters via surface runoff and erosion, a routing to the surface water network is performed on a grid basis, and the pesticide load reduction during transport in overland flow by reinfiltration or redeposition is explicitly calculated. Subsequently, the fractions of pesticide surface runoff loss and pesticide erosion loss from a cell that finally reach the surface water network are computed for each cell. This information is crucial for determining critical source areas and the sites where the establishment of additional mitigation measures will be most effective. FOOT-CRS produces several types of output:

- i. maps and spatial cumulative distribution functions (CDFs) of pesticide leaching concentrations (PEC_{gw})
- ii. maps and spatial CDFs of pesticide losses from fields and pesticide inputs into the surface water network
- iii. temporal CDFs of Predicted Environmental Concentrations in surface water (PEC_{sw}) at the catchment outlet (i.e. for one point in space), for different pesticide input pathways. These CDFs can e.g. be used to determine the return period of a given peak exposure concentration.

Results of the second evaluation step of the FOOT-CRS tool against experimental data from the Rohr catchment in the Swiss plateau will be presented. Modelled pesticide losses from fields and inputs into surface water bodies as well as pesticide concentrations at the catchment outlet are compared with measured data obtained by the EAWAG during a controlled application experiment in 2000.

In the first evaluation step (cf. poster presentation at the EGU 2010), the output of a standard FOOT-CRS simulation (with a 20-year FOOTPRINT weather time series for the appropriate climate zone) was compared statistically with the measured data, to check the plausibility of the FOOTPRINT results and the representativeness of the FOOTPRINT weather series for the Rohr catchment.

The second evaluation step now involves a non-standard FOOT-CRS simulation, using a modified version of FOOT-CRS with new underlying modelling databases. These new modelling databases contain the results of new MACRO and PRZM simulations run with the original weather time series observed during the experiment and have a daily resolution (as opposed to monthly maximum values in the standard FOOT-CRS). Consequently, the modified FOOT-CRS produces daily time series of PEC_{sw} at the catchment outlet.

In the second evaluation step, a direct comparison of simulated and measured concentration and flux time series can be performed. This step therefore allows an evaluation of the FOOT-CRS model structure and parameterisation.