

Development of a methodology to assess atmospheric deposition on surface waters

Theme: Water Framework Directive

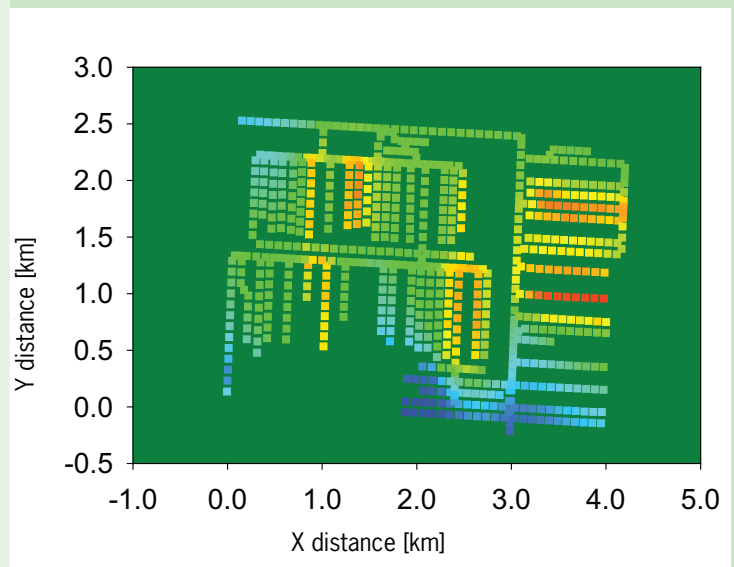
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Problem

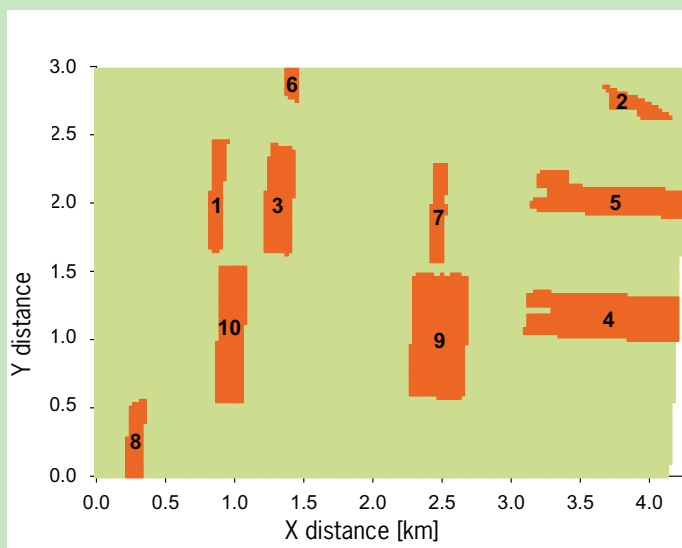
For the assessment of the risk to exposure of aquatic organisms to plant protection products (PPP), all relevant pathways of PPP inputs need to be considered. Up to now, PPP loadings due to atmospheric deposition have not been taken into account.

Approach

- A coupled PEARL-OPS model has been developed to assess the exposure of surface waters due to atmospheric deposition at catchment scales. This tool has been improved to allow multiple application patterns and to support a more flexible definition of receptor points
- The new version of PEARL-OPS has been tested for the CASCADE example area. The sugar beet fields in the area were treated with the same substance at the same rate, but the time of application was different (see figure below). The water courses were divided in segments with a maximum length of 100 m. The deposition was calculated on the node of all segments



The deposition (g/ha) on the segments of the water courses in the CASCADE area as calculated with PEARL-OPS.



Location of the treated sugar beet fields. Field number is the same as the day-in-month number in May for the application.

Results

The results of the example run are shown in figure above:

- Highest deposition rates are calculated in the vicinity of the sources
- The deposition decreases with downwind distance from the source area. The rate of decrease depends on the meteorological conditions
- The deposition rate on the water segments depends on the application characteristics, the physico-chemical properties of the substance and the meteorological conditions

Future use in risk assessment

- PEARL-OPS can be used to assess atmospheric deposition on water surfaces in small catchments (tens of km²) in the risk assessment for aquatic organisms to plant protection products
- The tool can also be used to compare deposition on water surfaces due to spray drift with deposition on water surfaces due to atmospheric deposition

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