

TIME DEPENDENT SHORT DISTANCE MODELLING AND THE VALIDATION OF MODEL

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Most dispersion models are made for stationary concentration values. This is appropriate for modelling gas pollutants to evaluate a deposition value (mg/m^2) during a period of time.

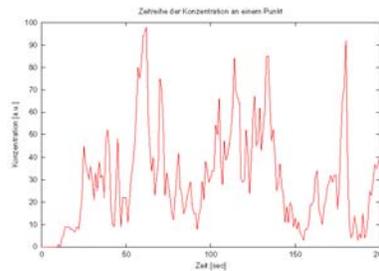


Figure 1. Time series of simulated odour propagation.

This is not the target value in some terms of interests like the modelling of odour propagation.

It is needed to get time series of the concentration of less than a second to determine the fluctuation of time with a concentration above the odour threshold.

The model NaSt3D developed at the University of Bonn reaches this by using no turbulence models for the propagation of the wind field.

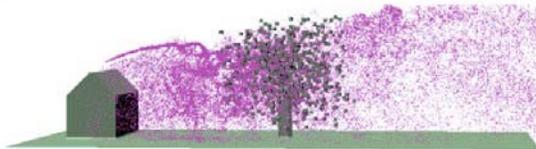


Figure 2. Dispersion behind a tree

Numerical stability and a small effect of numerical diffusion has been achieved by using the special discretisation scheme VONOS (Variable Non Oscillating Scheme).

The model has been validated, so that the concentration fluctuations fit in a convenient way to short range measurements.

Odour dispersion modelling is mostly important in rural areas with special boundary conditions.

The effects of non solid obstacles like trees or hedgerows on the time series can be simulated with NaSt3D. The attempts showed that “semipermeable” obstacles can be used to prevent odour nuisance much better than solid ones.

This tool can be used for regulatory purposes for short distance situations with complex orography and obstacle conditions.