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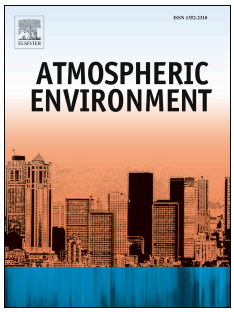

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ACCEPTED MANUSCRIPT

A simple model to assess odour hours for regulatory purposes

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Abstract

A novel methodology for estimating odour hours in the frame of licencing procedures is presented. In contrast to the widely used constant-factor-4 model, which is the prescribed method in Germany, a model based on computing concentration variances is proposed. It is derived upon the advection-diffusion equation for the concentration variance, but is strongly simplified by neglecting the transport and diffusion terms. In this way, the method becomes extremely efficient with regard to computation times. Furthermore, the model is independent on the type of dispersion model used to calculate average concentrations, which are necessary for subsequently computing concentration variances. In a second step, simulated concentration variances are used in combination with a slightly modified two-parameter Weibull probability density function to get the 90th percentile of the cumulative frequency distribution of odour-concentration fluctuations, which is required for computing a so-called odour hour. The model is operated in post-processing mode and can, thus, easily be implemented in existing dispersion models. It's validity has been tested against two tracer tests carried out in Germany and the U.S.

Keywords

GRAL; Odour-Hour Modelling; Concentration-Variance Model; Concentration-Fluctuation Intensity

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