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ABSTRACT

ODOUR SOURCE IDENTIFICATION IN A COMPLEX FLOW ENVIRONMENT USING A PARTICLE TRAJECTORY MODEL

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Back trajectories are a useful tool for facilities to identify odour sources for timely management actions to be implemented, thereby minimising potential offsite complaints. However, current trajectory models cannot accurately depict particle motion in industrial situations where air flow is almost always subject to interference from structures. In addition, the spatial and temporal resolution of the data used in the current trajectory models is often too coarse to resolve the flow in these situations.

The paper presents a methodology that generates complex flow fields based on the Navier-Stokes equations for fine-mode trajectory modelling. An initial u- and v-component of wind is input to the model from an onsite weather station, or preferably, an anemometer attached to an ambient air quality monitor. The perturbated flow will then be calculated in an iterative fashion until the numerical solution converges. The results will then be stored and the next initial u- and v-component of wind will be input from the anemometer. Each solution will be stored and converted for use in the particle trajectory model.

The backward kinematic trajectory model is Lagrangian, with atmospheric motion being described in terms of individual air parcels moving with air streams. A turbulence parameterisation scheme and a particle reflection scheme for when/if particles impact on structures has been incorporated into the model.

The paper will present information on model performance based on field experiments.

Indicate preference of kind of presentation
- ¤ Oral Communication

Indicate session in which authors propose to present their work:
- ¤ Session III. Calculation of the odour impact. Odour dispersion modelling.