

Environmental aerodynamics



gases
dust particles

smoke
aerosols

radiation fallout

What we do

We investigate turbulent airflow using physical modelling in a wind tunnel, focusing on applications with environmental implications. Using scaled experimental models, we simulate diverse physical and chemical processes, including urban and indoor ventilation, the dispersion of hazardous materials (gases, dust particles, aerosols, radioactive substances), and wind energy potential. Our unique experimental approach complements numerical models and real-world measurements in exploring physical phenomena.

Our topics

- ✓ hazardous substance releases in urban areas;
- ✓ ventilation of street canyons;
- ✓ ventilation of buildings and rooms;
- ✓ natural variability of short-term gas releases;
- ✓ dispersion of dust from surface mines and processing technologies;
- ✓ atmospheric boundary layer flow.

Facility & equipment

- ✓ open-circuit low-speed wind tunnel (cross-section 1.5 x 1.5 m², length 25 m);
- ✓ smoke and laser sheet flow visualization;
- ✓ particle image velocimetry, sampling rate up to 1000 Hz;
- ✓ laser doppler anemometry;
- ✓ flame ionisation detector, sampling rate up to 300 Hz.

Areas of possible collaboration

- ✓ validation of numerical models for dispersion of hazardous substances;
- ✓ expansion of point measurements in the real atmosphere by spatio-temporal relationships;
- ✓ extension of time series under stationary meteorological conditions;
- ✓ parametric studies to optimize shape, size and location of buildings to improve ventilation or wind energy utilization.

Laboratory of Environmental Aerodynamics

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