

AIRVIRO ON THE WEB – SEPTEMBER 2009

DISPERSION

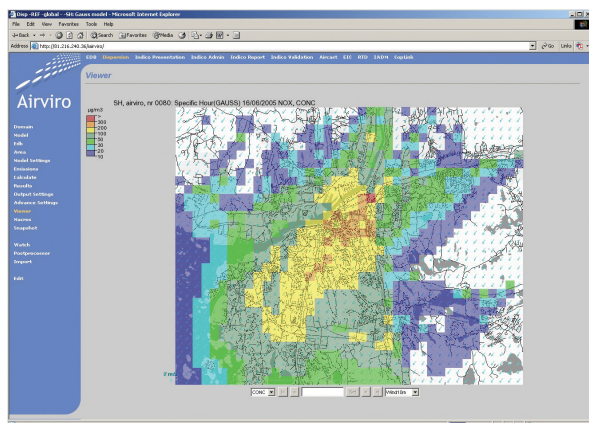
The Airviro dispersion simulation system uses the dynamic emission database together with the wind and dispersion models.

THE EMISSION DATABASE (EDB)

The EDB handles time and temperature variations in emission rates from point, area and line (traffic) sources. Please refer to the module description of EDB.

THE METEOROLOGY PRE-PROCESSOR AND THE WIND MODEL

A pre-processing routine analyses data from local meteorological stations, where wind direction and velocity as well as vertical temperature profiles are measured. Boundary layer scaling parameters- such as surface friction velocity and the Monin-Obukhov length- are determined. Wind field simulation using the diagnostic wind model takes the effects of topography, surface roughness and surface heating/cooling into account.



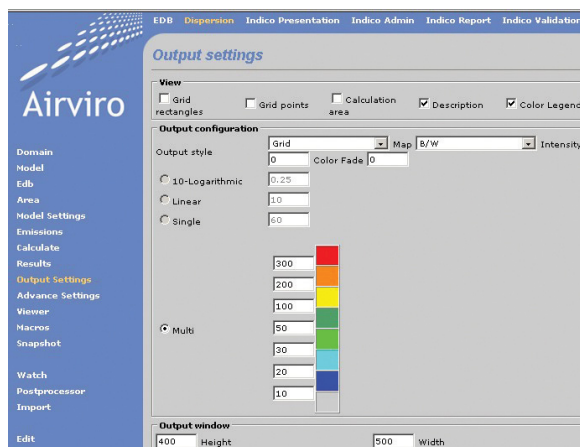
THE GRID POINT DISPERSION MODEL

The Airviro system includes both Gaussian plume model and a time-dependent grid point model. The latter is recommended for applications in complex terrain- like the Swiss Alps and where time variations of pollution levels are of interest. The 3D advections/diffusion grid model uses a K-formulation to describe the vertical diffusion. Algebraic profiles for turbulent diffusion are determined from the boundary layer parameters, together with surface roughness conditions. The numerical technique includes a finite element method in the horizontal plane, using linear base functions in the element description. The solver uses equation-splitting in the three space directions and in time. A central difference scheme is chosen for the vertical advection and diffusion terms. A Grank Nicholson scheme is applied

in the horizontal plane and forward time stepping is used in all directions. The grid model allows deposition and chemical processes to be included in a straightforward way

THE AIRVIRO RECEPTOR MODEL

The most probable locations of the emission sources in a given area can be estimated using the Airviro Receptor model, based on a reverse dispersion concept. The input data required are time series of meteorology and of measured concentrations of pollutants in the ambient air. Once the sources have been identified, you may also be able to estimate the strengths of the emissions if you can provide or estimate some information about the characteristics of the sources.



INTEGRATING YOUR OWN DISPERSION MODEL IN THE AIRVIRO SYSTEM

The use of well-defined interfaces between the different modules in the Airviro system makes it possible to integrate new dispersion models (your own, for example) with the other modules in the system.

För mer information kontakta:

Namn Namnsson
tel 031-251 8987
e-post namn.namnsson@smhi.se

Namn Namnsson
tel 011-495 8333
e-post namn.namnsson@smhi.se