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OML-Highway

An Air Pollution Model for Highways in a GIS Environment

Abstract

NERI has developed a user-friendly air pollution model, designed to assess and map air pollution along roads in open areas. (Jensen et al.; 2010)

Model

OML-Highway is a local-scale Gaussian air pollution model specially designed to describe the dispersion of air pollutants along roads with an open roadside environment (Jensen et al.; 2004). It is based on the OML model (Olesen et al., 2007) which is designed for air quality assessment based on point sources. OML-Highway estimates dispersion from point and area sources. In OML-Highway, road sources are approximated as area sources. The parameterisation for the initial dispersion is based on the formulation in the **O**perational **S**treet **P**ollution **M**odel (Berkowicz, R., 2000), but is slightly modified with regard to highways.

OML-Highway has been successfully evaluated against datasets from Denmark and Norway for the pollutant NO_x (= $NO+NO_2$) and it has also been compared to other similar models (Berger et al., 2010).

Methods

- integration into SELMAGIS as extension of ArcGIS (Lorentz and Düring; 2008)
- interface to the emission module of WinOSPM, which is based on COPERT4
- possibility to aggregate traffic emissions from road networks into area sources
- consideration of the influence of noise barriers on the dispersion of air pollutants
- evaluation against datasets including NO_x, $PM_{2.5}$, PM_{10} and particle number

Results

- guided operating of the model (wizard)
- full control at any time over input data
- input data generation using GIS capabilities
- data visualisation and editing via custom GUI
- build-in data conversion tools

Fields of Application

- Systematic Mapping of Air Quality and Human Exposure
- EU Ambient Air Quality Limit Values
- Environmental Impact Assessment
- "What if" Scenario Analysis
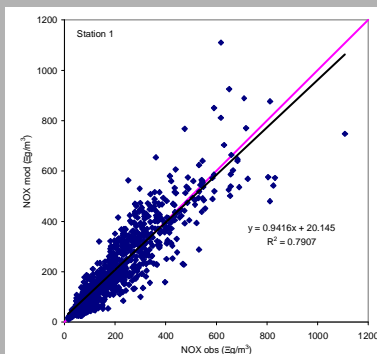
Comparison of measured and modelled concentrations. Distance of 3m from the outer traffic lane; Wind direction (DD>= 240 or DD<=60)
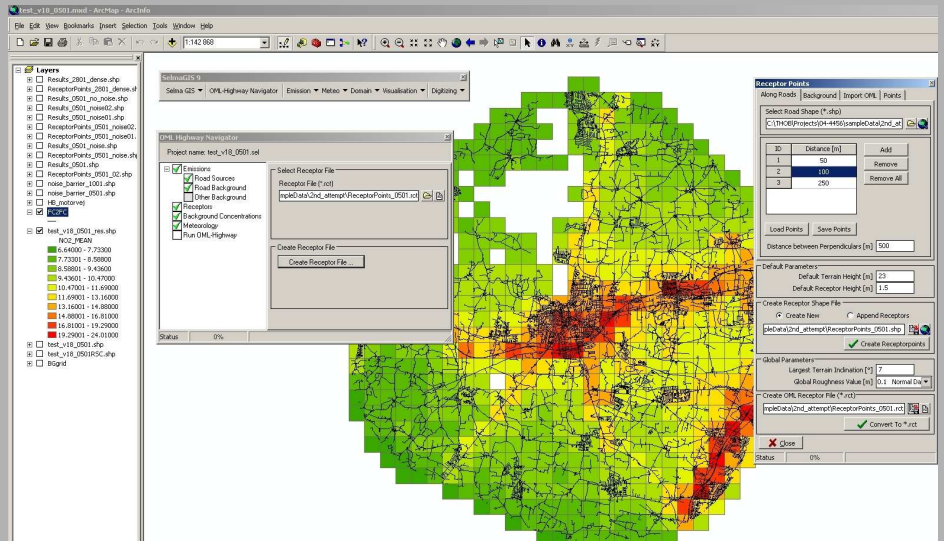
OML-Highway within the GIS environment
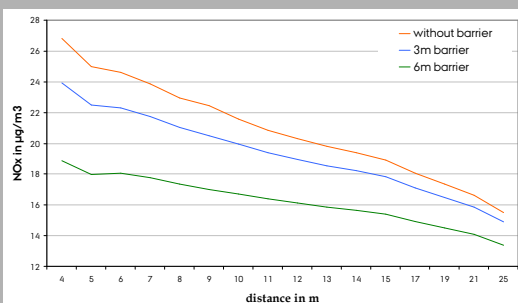
Effect of noise barriers of 3m and 6m height compared to a situation without noise barrier at a motorway

Receptor points along the motorway, showing NO2 concentrations

References see extended abstract