AIR QUALITY IMPACT OF THE PORT OF AMSTERDAM DEVELOPMENT OF AN

AIR QUALITY TOOL

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THE AIR QUALITY TOOL

The air quality tool facilitates calculation of annual mean NO_2 and PM_{10} concentrations in and around the port region (Figure 1) at a 100 x 100 m grid for the years 2009, 2015 and 2020. Scenarios can be investigated by adding new emission sources and by assigning scenario factors to individual emissions. The graphical user interface is shown in Figure 2.

The tool is based on the urban air quality model Urbis, which includes dispersion models for traffic emissions and point sources. Concentrations of air pollutants from industrial facilities, mobile machinery, storage and trans-shipment of bulk materials, and from maneuvering ships and ships at berth are simulated with the dispersion model OPS. Total concentrations are calculated by addition of the contribution from the local sources to maps of large-scale air quality concentrations in the Netherlands.

EMISSIONS

To assess the air pollutant levels, a detailed inventory of emission sources was carried out for the port of Amsterdam. Emissions from large industrial facilities were taken from a national database or background documents of environmental permits. Emissions of seagoing ships were based on AIS-data and detailed harbour statistics in combination with national shipping emission factors. Emissions of inland shipping were derived from national inland shipping traffic data and emission factors.

CONCENTRATIONS

Figure 3 shows an example of the calculated PM_{10} concentrations in the port region for 2009. The highest concentrations are located in the port area. Figure 4 shows the calculated contribution from all port emissions to the total PM_{10} levels. Outside the port region, the contribution is generally small (< 3 $\mu g \cdot m^{-3}$), except for a small area to the east of the port, where the contribution to the PM_{10} levels is about 30 $\mu g \cdot m^{-3}$. Additional calculations indicated that the contribution from the port emissions is mainly caused by storage and trans-shipment of bulk materials. The emissions from maneuvering ships and ships at berth contribute little to the calculated air pollutant levels (< 1 $\mu g \cdot m^{-3}$).

For more information, please read the extended abstract.

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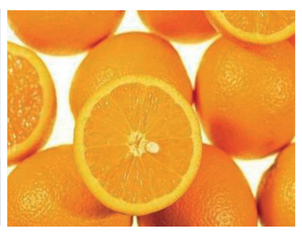



THE PORT OF AMSTERDAM HAS THE AMBITION TO EXPAND AND TO DOUBLE THE TRANS-SHIPMENT BUSINESS BY 2020. AT THE SAME TIME, THE URBAN AREA OF AMSTERDAM IS GROWING, NEW HIGHWAYS ARE BEING BUILT AND BACKGROUND AIR POLLUTANT CONCENTRATIONS ARE HIGH. IN THIS SITUATION, THE AIR QUALITY IS A CRITICAL ASPECT.

TO ASSESS THE IMPACT OF THE EMISSIONS IN THE PORT ON ITS ENVIRONMENT, AN AIR QUALITY TOOL HAS BEEN DEVELOPED. IT CALCULATES THE CONTRIBUTION FROM THE PORT EMISSIONS TO THE TOTAL AIR POLLUTION FOR NITROGEN DIOXIDE (NO_2) AND PARTICULATE MATTER (PM_{10}).

THIS TOOL ENABLES STRATEGIC SELECTION OF NEW INDUSTRIAL SITES AND CAN ASSESS FUTURE SCENARIOS IN WHICH ACTIVITIES IN THE PORT WILL BE INTENSIFIED.

Figure 1. Map of the port region for which concentrations are calculated. The port of Amsterdam is indicated by the red line. The total area measures 21 x 15 km.

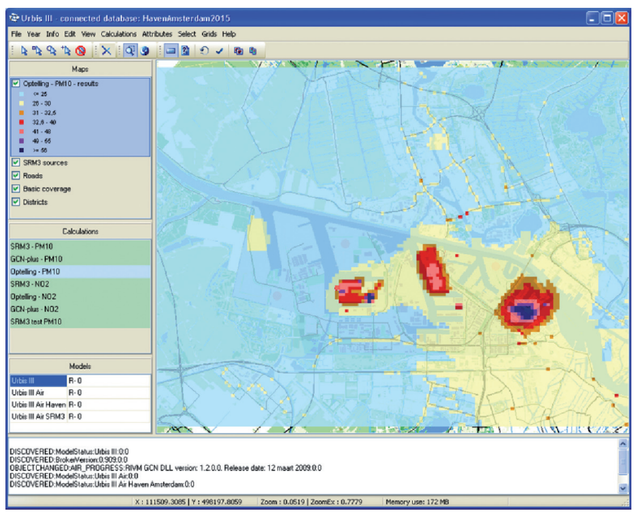

Figure 2. User interface of the air quality tool.

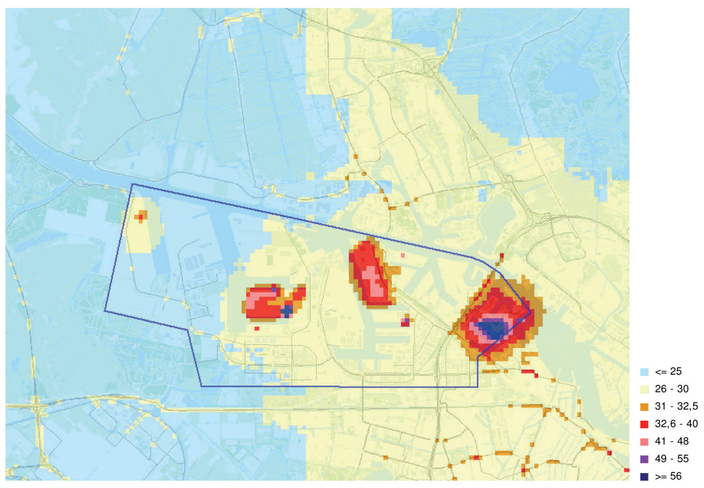

Figure 3. Calculated annual mean PM_{10} concentrations for 2009 ($\mu g \cdot m^{-3}$). The port region is indicated by the blue line.

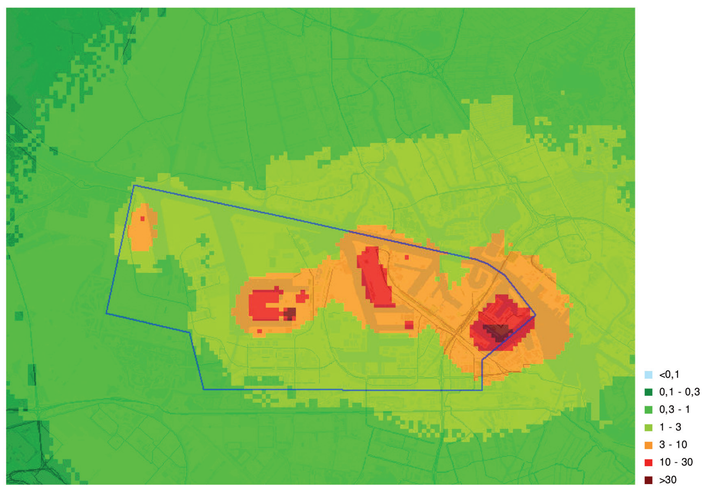

Figure 4. Calculated annual mean PM_{10} concentrations due to emissions from the port region for 2009 ($\mu g \cdot m^{-3}$). The port region is indicated by the blue line.

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