Contents

Latest model release: version 5.0.0, Apr 2020

News

Upcoming releases

CERC are working hard on the next versions of the ADMS family of models. Due for release this year are an updated edition of ADMS-Urban & ADMS-Roads and ADMS 6. The ADMS-Urban and ADMS-Roads update will include improvements to licence management and modelling of elevated roads. ADMS 6 will be the latest version of our 'industrial' model with an upgraded Mapper commensurate with that in ADMS-Urban. It will also include advances in the modelling of buildings. We will keep you informed about the status of these releases.

ADMS-Urban and ADMS-Roads User Group meetings

The 2020 ADMS User Group Meetings held on 18 and 19 November were a first for CERC as they moved online due to COVID-19 restrictions. There was still the usual mix of talks containing news, tips and case studies. Special thanks to guest speakers Melody Horan from Miller Goodall, Ruth Calderwood from the City of London, Yves Verlinden from ERM and Erica Powell from Arup.

The presentations are available to download from the CERC website User Area.

The 2021 User Group Meetings will take place on 24 and 25 November and will be held online due to the ongoing uncertainty around the COVID-19 situation. Registration is open now.

CERC at the Harmo20 conference

James O'Neill presented work on the development and evaluation of a model for pollutant dispersion from elevated roads at Harmo20. These developments will be included in the next general release of ADMS-Urban and ADMS-Roads and were funded by Highways England under the SBRI Innovate UK 'Developing digital roads and improving air quality' competition.

The 20th international Harmo conference (Harmo20) took place online between 14 and 18 June 2021. This conference series is part of an initiative aimed at harmonising dispersion modelling for regulatory purposes.

CERC's Managing Director, David Carruthers, chaired a session on the topic of 'Urban scale and street canyon modelling: Meteorology, air quality and passive control systems'.

Breathe London Pilot network extended into the COVID-19 recovery period

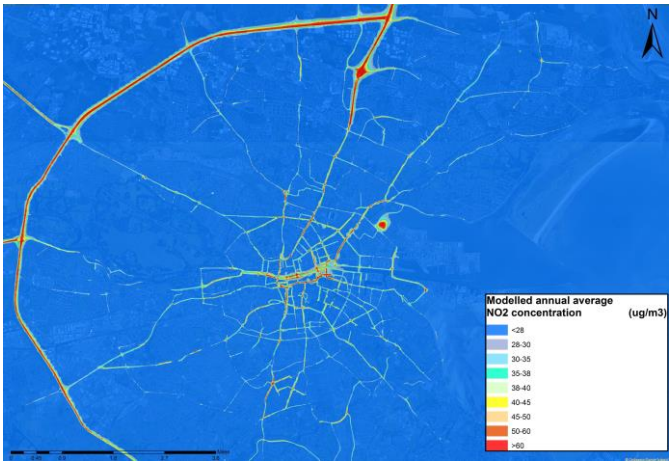
The Breathe London Pilot network of static AQMesh air quality sensors was extended to the end of April 2021 to capture the continued impact of COVID-19 measures. This has created a fully validated dataset covering the later phases of the COVID-19 recovery. The ongoing project will provide critical analysis, including source apportionment and emission index quantification, and data assimilation to determine emissions during the recovery phase where unprecedented changes in pollutant sources have occurred. The methodologies and techniques have wide applicability for air quality monitoring, analysis and policy beyond London and would inform similar issues elsewhere in the UK. The measurement data from the sensors is available at https://breathelondonpilot.org/.

Regional-to-local scale air quality modelling for Ireland

The Irish Environmental Protection Agency has contracted CERC to undertake regional-to-local scale air quality modelling for Ireland in order to generate air quality maps for the whole country.

The project couples regional and local scale models using CERC's ADMS-Urban Regional Model Link. This will combine regional modelling undertaken by the UK Centre for Ecology and Hydrology using the WRF mesoscale meteorological model and the EMEP regional chemical transport model, with local modelling carried out using ADMS-Urban.

This project builds on the success of CERC's previous Dublin air quality modelling work for the EPA.



2017 annual average NO_2 concentrations in Dublin, modelled using ADMS-Urban in the earlier study.

Advanced street canyon model derivation and validation published

CERC's article specifying a detailed derivation of the ADMS-Urban and ADMS-Roads advanced street canyon model has been published in the Journal of the Air and Waste Management Association. The paper also includes the results of validation studies comparing advanced street canyon, non-canyon and basic canyon modelled concentrations with measurements recorded within three individual European street canyons from the TRAPOS study, and with routine air quality monitoring sites across London.

The advanced canyon model is shown to have improved performance relative to the basic canyon or non-canyon modelling, particularly in relation to the variation of concentrations with wind direction and prediction of high concentrations.

Training Information

Upcoming training courses

Our training courses focus on giving users the knowledge and expertise to efficiently apply CERC software to real-life air quality problems.

CERC holds regular online courses; these have been extremely successful.

Course	Sep 21	Feb 22	Mar 22
ADMS-Roads	21 - 22	15 - 16	29 - 30
ADMS-Urban	-	-	1 - 2

Courses can also be customised to particular user requirements.

For more information on specific courses and dates and prices, visit the CERC website https://www.cerc.co.uk/training or contact CERC.

Discount on CERC training courses

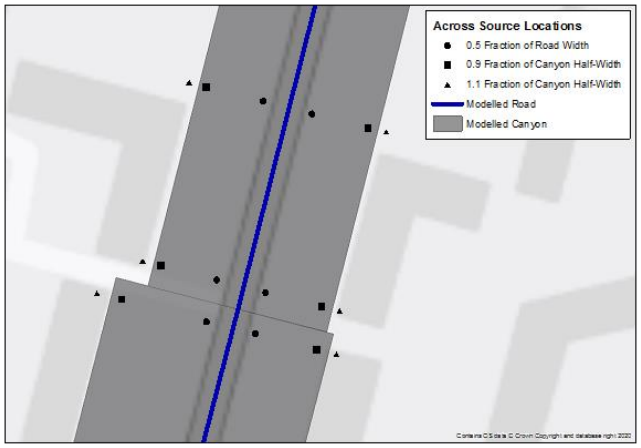
A 20% discount applies to scheduled CERC training courses, if purchased at the same time as a software annual licence or support renewal. This discount also applies to one-day refresher courses. Training must be booked within 12 months of purchase.

Modelling Tips

Grid output options with advanced street canyons

Source-orientated grid options in ADMS-Urban and ADMS-Roads add additional output points around road sources to enable the steep concentration gradients near roads to be captured in contour plots. The 'Additional Input File' (**.uai*) allows for fine control of these source-orientated grid points, both across and along modelled road sources.

When using the advanced street canyon option, the across road distances of these points can be defined in terms of both the modelled road and canyon characteristics. Absolute distances from the road centreline or edge, or distances as fractions of the road and canyon widths can be used.



The figure shows examples of using an absolute distance of 0.5 m from the road edge for kerbside concentrations, a fraction of 0.9 of the canyon half width for façade concentrations and a fraction of 1.1 of the canyon half width for concentrations outside of the street canyon.

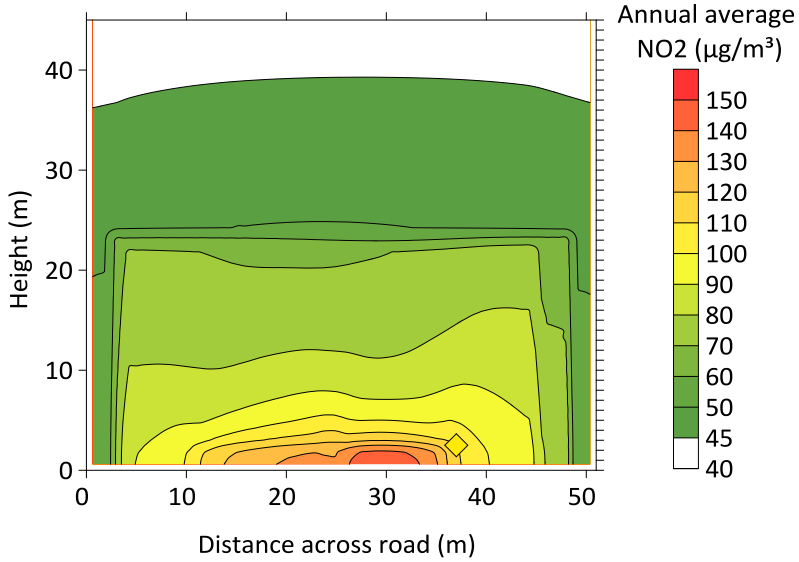
Using NAEI grid data in ADMS-Urban

NAEI grid source data are available by SNAP sector and as total emissions data from https://naei.beis.gov.uk/data/map-uk-das

You can download the NAEI data in .asc format and add this to the ADMS Mapper. The Extract Data Tool can be used to create a .csv file of emissions. Once you have created your .csv file of emissions data, you can edit it to create an ADMS-Urban emissions import file (**.eit*).

You can create an empty grid source in the ADMS-Urban interface, covering your area of interest, and export this grid to create the other files required for a full emissions import of grid source data. Adding the **.eit* file created earlier to the empty grid files (**.spt* and **.vgt* files), you then have a full set of files to import your grid source emissions into ADMS-Urban using the File_Import option.

Plotting vertical slice results



The ADMS-Roads/Urban utility 'Create vertical slice file' can be used to investigate how pollutant concentrations vary with height; this is particularly useful for concentrations across a road. Once the model has been run, the concentrations can be visualised using Surfer or a similar contour package. The concentration contour plot you are aiming to create will show a distance value against height.

If the vertical slice has been modelled using real world coordinates, the first step will be to convert the coordinates you have used into distance. The easiest way to do this is in Excel. Then, within Surfer, grid your data, specifying distance as the 'X' value, height as the 'Y' value and the pollutant concentration as the 'Z' value. Finally create a contour plot of your gridded data.

Recent Publications

Hood C, Stocker J, Seaton M, Johnson K, O'Neill J, Thorne L and Carruthers D, 2021: *Comprehensive evaluation of an advanced street canyon air pollution model*. Journal of the Air & Waste Management Association, vol. 71, issue 2, pp. 247–267. Article online

Azhari A, Abdul Halim ND, Othman M, Latif MT, Juneng L, Sofwan NM, Stocker J and Johnson L, 2020: *Highly spatially resolved emission inventory of selected air pollutants in Kuala Lumpur's urban environment*. Atmospheric Pollution Research. Article online

Aktas YD, Wang K, Zhou Y, Othman M, Stocker J, Jackson M, Hood C, Carruthers D and Latif MT, 2020: *Outdoor thermal comfort and building energy use potential in different land-use areas in tropical cities: case of Kuala Lumpur.* Atmosphere, vol. 11, no. 652. Article online

A comprehensive list of all our publications may be found on the publications section of our website.

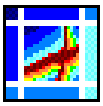
Products and Services

CERC has been developing world-leading air dispersion and complex flow modelling solutions since 1985. Our consultancy team was established to apply our expertise to a wide variety of applications for a diverse client base.

Other software solutions

ADMS 5

Local scale air quality modelling for industrial sources



ADMS-Urban Regional Model Link

Automated nesting of ADMS-Urban within a regional air quality model

ADMS-Airport

Urban scale modelling with detailed treatment of aircraft emissions

GASTAR

Modelling emergency releases of dense gases

FLOWSTAR-Energy

Modelling wind energy and airflow at high spatial resolution for wind farm planning and other airflow-related applications

ADMS-STAR

Short-term accidental release modelling

For custom-made software solutions, see https://www.cerc.co.uk/research or email CERC.

Consultancy services

Our consultancy services include:

- Air quality assessments, e.g. odours, LAQM, planning and permitting
- Specialised modelling, e.g. dioxins, accidental releases, wind energy
- Compilation of emissions inventories and forecasting for large urban areas
- Project support and review services
- Research with complex atmospheric flows and air quality

For more details, see https://www.cerc.co.uk/consultancy or email CERC.

Contacting the helpdesk

The CERC helpdesk is on hand to provide model support. Contact us:

- From the ADMS-Urban or ADMS-Roads interface, select Help, Email CERC
- Email help@cerc.co.uk