

Foreword

Investigating the impact of applying different grid resolutions of NWP data in atmospheric dispersion modelling

The current trend in atmospheric dispersion modelling is to use data from Numerical Weather Prediction (NWP) models to provide the meteorological inputs for dispersion models. This trend is in part due to the decrease in number of meteorological stations at relevant locations and to the improved quality and availability of NWP data.

One aspect in which NWP data is improving is its horizontal spatial resolution, with model outputs recently being made available at resolutions of about one kilometre. However, it is unclear if better dispersion modelling outcomes are always achieved using the highest resolution NWP data. There have also been concerns expressed that dispersion models featuring sub-models to account for unresolved terrain features may be “double-counting” for terrain effects when using high resolution NWP data.

To address these concerns, the ADMLC sponsored a review of the consequences of using different spatial resolutions of NWP data on the predictions of atmospheric dispersion models. The scope of the review included both air quality modelling and probabilistic accident consequence assessments. The NWP datasets included different grid resolutions from 1 km to 10 km, produced from two different NWP models: the Weather Research and Forecasting (WRF) model and the Met Office Unified Model. The work was led by Cambridge Environmental Research Consultants (CERC) and the UK Health Security Agency (UKHSA). The review report presented here provides a comprehensive investigation of the effect of selected NWP datasets on dispersion model predictions. The ADMLC hopes that this work will be of benefit to both regulatory agencies and the wider dispersion modelling community.

Disclaimer: This report and the work it describes were undertaken by Cambridge Environmental Research Consultants (CERC) and the UK Health Security Agency (UKHSA) under contract to ADMLC. Its contents, including any opinions and/or conclusions expressed, or recommendations made, are not necessarily those of ADMLC or its members. The conclusions and recommendations presented in this report do not replace published guidance on air quality impact assessments by the relevant agencies. However, they show that the use of NWP data in dispersion modelling assessments needs to be carefully considered and that uncertainties arising from such data should be identified and included.

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