Description of work for website

Topic of interest to ADMLC

Application of dispersion modelling to the design of local monitoring

Description

Dispersion modelling can be used to inform the design of ambient air-quality monitoring schemes by showing how monitor types, locations and schedules can be optimised to collect efficient and effective data for managing sources. But monitoring is often not planned with modelling. This may be because monitors have been relatively bulky, expensive and inflexible (e.g. needing mains power) so plans have been governed by these factors – with little scope to refine them with modelling. However, recently monitors have been developed that are smaller, cheaper and more flexible, so they can be deployed more widely (e.g. in networks) and by more users (e.g. by public and environment groups as well as by industry and regulators). So there is now more scope to use modelling to develop and refine monitoring plans. The benefits from using modelling to inform monitoring include:

- Savings from getting the same or better information from fewer or cheaper monitors;
- More frequent and better-resolved data on the impacts of specific sources;
- Earlier detection of adverse trends in impacts and/or in the performance of emission control systems;
- Better information for targeting improvements on relevant sources and for evaluating their effectiveness;
- Better ambient data for evaluating individual source emissions with inverse dispersion modelling;
- Better understanding between regulators, industries and public when interpreting monitoring results.

Because monitoring plans are rarely informed by modelling, these benefits are rarely realised, and may only be recognised after issues arise with monitoring that was not informed by modelling. For the same reason, there is limited information and experience on how modelling can be used to support monitoring design. But plans for deploying monitors are better informed if modelling is done beforehand to predict and map the measurable "signals" expected at potential monitor locations. The predictions can cover different: pollutants; averaging times (short/long-term); positions (fore/background, down/upwind); statistics (percentiles, data for angular sectors); and obscuring impacts, i.e. "noise", from other sources that may overlay the "signal" from a particular source of interest.

ADMLC is interested in a review of how dispersion modelling can be applied to inform the design of ambient monitoring schemes, and in the development of recommendations for improved applications. This is a large topic, so initial focus might be on:

- Local impacts due to a "main site" that emits from point (stack) and area (low-level fugitive) sources.
- Dispersion over flat terrain without building effects (rather than over complex/urban topography);
- Static monitors that measure regularly at their locations (rather than mobile or remote-sensing devices).

Such a review could usefully consider how modelling can be used to predict "signals" and "noise", and how such predictions can be mapped and used to design efficient monitoring schemes for detecting, distinguishing and tracking "main site" impacts.