NitroEurope IP as a contribution to the EMEP Monitoring Strategy

Dissemination presentation to the Task Force on Measurement and Modelling (TFMM), of the UNECE Convention on Long-Range Transboundary Air Pollution.

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Mark Sutton, CEH Edinburgh.

The work of NitroEurope IP (NEU) is relevant to several international conventions including the Convention on Long-Range Transboundary Air Pollution (CLTRAP). Under the CLTRAP, measurement and modelling of transboundary air pollutants, including nitrogen compounds, are coordinated by EMEP (the European Monitoring and Evaluation Program), as informed by the Task Force on Measurement and Modelling (TFMM). NitroEurope provides a significant contribution to the meeting of the EMEP Monitoring Strategy (2004-2009).This presentation provided a contribution to disseminate awareness of NEU, showing how it contributes to the implementation of the EMEP Monitoring Strategy, and highlighting other measurement and modelling links of interest to the CLRTAP.

It was explained how NitroEurope addresses the key question: "What is the effect of nitrogen on the European greenhouse gas balance?" Nitrogen contributes to the greenhouse gas balance in various ways including influence on N_2O, CH_4 and CO_2 fluxes, as well as on NH_3 fluxes, aerosol formation and interactions with ozone. NitroEurope addresses this question by a combination of measurement and modelling activities in six main science components (Flux Network, Manipulation Network, Plot Podelling, Landscape Analysis, European Integration, Verification).

The largest component of NEU, and that most closely linked to the EMEP Monitoring Strategy, is the **Flux Network (Component 1**). In parallel with EMEP, C1 has been designed with a 3-Level structure, providing detailed measurements at a few sites and simpler measurements at many sites. Specifically, it includes:

13 Level 3: "Super Sites" for N and GHG flux measurement (providing advanced high time resolution measurements of interest for improving process understanding).

9 Level 2: "Regional Sites" for long-term monitoring of N and GHG flux trends, developing and applying new low-cost N flux measurement techniques.

50 Level 1: "Inferential Sites" measuring reactive N concentrations in order to estimate dry and wet deposition at CarboEurope IP sites.

In particular, the Level 1 network has an important secondary objective, closely linked to the EMEP strategy, of providing a Europe-wide network to measure nitrogen compounds using low-cost techniques, that speciate gaseous NH_3 and HNO_3 from aerosol NH_4^+ and NO_3^-. A special TFMM workshop on the DELTA methodology was organized and reported in an accompanying presentation to TFMM. While the DELTA method will be applied in NEU directly, the TFMM Delta Workshop was attended by experts from 15 countries and encouraged wider dissemination to EMEP countries and institutes not involved in NEU. Data were presented to show the reproducability of the method and the intercomparison with the

classical daily EMEP filter pack method (which reports only the sum of gas and aerosol components).

The European distribution of the NEU Level 2 and Level 3 sites was reported, showing how these are representative of the European "climate space" and different major ecosystem types. It was explained how the measurements at the Level 3 super sites consist of both a) "core measurements" - looking at long term trends and b) "special topics" that advance the science with new technological applications for e.g. campaign measurements. It was noted that the second of these would also contribute to the annual EMEP "intensive periods".

Finally, an overview was given of the other aspects of NEU. The main link points with EMEP are:

Component 2, Manipulation Experiments provide an improved understanding of the responses of N and GHG fluxes to global change pressures.

Component 3, Plot Scale Modelling will improve ecosystem models of C and N cycling, including improved parametrizations of reactive N emission and dry deposition.

Component 4, Landscape Analysis provides a spatial assessment of subgrid variability at a very fine scale, showing the role of nearby vs transboundary sources.

Component 5, European integration will be developing improved emission inventories across Europe for N and GHG including improvement of the dry deposition scheme in the EMEP Unified Model.

Component 6, Verification will test the models against indepentent datasets not used in the model formulation. In particular, the L1 DELTA network will provide valuable information for model verification relevant for EMEP, while inverse modelling will be applied for N_2O and CH_4 emissions. The work will address the issue of spatial uncertainty (including nested models for key European regions, e.g. EMEP4UK development), uncertainty analysis, and the integration of uncertainty analysis into the procedures for assessment of compliance with international emissions ceilings.