

Programme for

Workshop on emissions, transport, deposition and effects of base cations in relation to acidification

in Göteborg 26-28 November 2003

Expected outcome of the workshop

The conclusions and the summarised knowledge from the workshop will be a state-of-the-art description of emissions, dispersion and deposition of base cations over Europe to be served for assessing environmental effects. The workshop will in particular evaluate the knowledge with respect to mapping the base cation deposition over Europe in order to form a basis for the application of dynamic models in the coming air pollution abatement strategies in Europe. The material will reflect present situation, the historical development and prospects for the coming 10-20 years.

The workshop will be held at Hotel Scandic Opalen (www.scandic-hotels.com). Please, book your accomodation not later than October 15th.

November 26

13.00 – 14.20 Introductory session

Data on base cation deposition are important for studying the effects of acidification of soils and waters, since it, together with weathering, provides ions for neutralising input of acidity. After sufficient reductions of acidifying deposition, it will be a source for replenishing lost base cation pools. The deposition of base cations from the atmosphere is large enough to significantly influence the critical loads of acidity and their exceedances. For the integrated assessment modelling to support strategies of pollution abatement over Europe, there is a need for reliable data on the base cation deposition. Consequently, the uncertainties in data used will be of importance for the abatement strategies for acidification over Europe. The workshop will summarise the state-of-knowledge of emissions, dispersion and deposition of base cations over Europe. The workshop will in particular evaluate the knowledge with respect to mapping the base cation deposition over Europe as a basis for the application of dynamic models in the coming air pollution abatement strategies in Europe. The knowledge must reflect present situation, historical development and prospects for the coming 10-20 years.

Welcome and introduction – The aim and expected outcome of the workshop

Peringe Grennfelt, IVL Swedish Environmental Research Institute and ASTA project

The need for base cation deposition data of interest for evaluating the effects situation in Europe

Till Spranger, Umweltbundesamt in Berlin
Matti Johansson, UNECE Geneva

14.00 – 14.20 **COFFEE BREAK**

14.20 – 15.00 **Emission data as input to modelling of base cation deposition**

Data are needed on anthropogenic emissions and their changes since around 1850 including prospects until 2020. Particles containing base cations are emitted from combustion of coal and wood fuels, industrial processes, etc. A few studies of base cation emissions have been made so far and some data are available. To make inventories, statistics are needed on energy production, industrial production, and other aspects. Significant infra-structural changes in society over the period must also be considered. Emissions are of anthropogenic and natural origin. Assumptions have to be made on the development of different sources. Also natural sources are influenced by human activities, such as land use, agricultural practises, etc. The climate change may influence the erosion and transport of soil containing base cations via changes in storm frequencies, precipitation and draughts.

Emissions of base cations - how are they possible to estimate on a European scale?

Arne Semb, Norwegian Institute for Air Research

The emission trend perspective – Swedish experience

Gun Lövblad, IVL Swedish Environmental Research Institute

15.00-15.30 Discussion and conclusions regarding emission data available and methods possible to use for the emission estimate, the importance of natural sources and future scenarios for base cation emissions

15.30 – 18.00 **Monitoring base cations in air and monitoring base cation deposition as input data to modelling – National experiences**

The mapping of base cations depends on good quality monitoring data. This is essential when estimating base cation deposition by data assimilation as well as for the validation of model calculations based on emission data. Trends in deposition are possible to follow using the long time series available in some monitoring networks. The EMEP monitoring network as well as other networks have monitored base cations in precipitation for several decades and these data may help us estimating the integrated deposition over the last century. However, also data on base cations in air, throughfall and on surrogate surfaces are valuable for quantifying total deposition is of value.

Mapping base cation deposition in Germany

Till Spranger, Umweltbundesamt, Berlin and Task Force on Mapping

Dry deposition of base cations at two geochemically contrasting sites in the Czech Republic

Pavel Kram, Czech Geological Survey, Prague, Czech Republic

Base cation deposition in Finland

Tuija Ruoho-Airola, Finnish Meteorological Institute, Helsinki, Finland

Base cation deposition in UK

Ron Smith, Centre for Environment and Hydrology, Edinburgh, Scotland

Local and large scale deposition of base cations in Estonia

Katrin Pajuste, Estonian Environmental Research Centre, Tallinn, Estonia

Trend of base cation deposition at the Czech EMEP and ICP-IM sites

Milan Vana, Czech Hydrometeorological Institute, Kosetice, Czech Republic

Surrogate surface methods to estimate base cation deposition data

Martin Ferm, IVL Swedish Environmental Research Institute

Input and output of base cations in a forested catchment

Hans Hultberg, IVL Swedish Environmental Research Institute

November 27

09.00 – 09.30 **Monitoring base cations in air and deposition as input data to modelling - the European perspective**

Data available over Europe for base cation deposition mapping – the ICP Forests data base

Olle Westling, IVL Swedish Environmental Research Institute

Discussion and conclusions regarding base cations in air, precipitation, throughfall and other monitoring data available on a European scale and methods possible to use for estimating deposition, how to deal with local deposition, etc.

10.00-10.30 **COFFEE BREAK**

10.30 – 12.00 **Modelling base cation deposition from emission data and from air quality and wet deposition data**

For the Convention on Long-Range Transboundary Air Pollution it is essential to map the deposition of base cations in relation to the contributing sources. It is of importance to know whether the base cations originate from anthropogenic or natural sources, not least from the aim of making abatement strategies and prognoses for future. The EMEP model is available for calculating the fate of particle emissions, as long as the emission data are available.

When emission data lack an alternative method to map the total deposition is the use of an atmospheric transport model combined with data assimilation, based on monitoring data on concentrations of base cations in air and precipitation. The data assimilation approach will include contributions from all dry as well as wet deposition processes, also from those - such as soil erosion -, for which emission data are not easily quantified. The advantage is that the total deposition is mapped in detail with regard to atmospheric chemistry measurements as well as meteorological conditions and land-use information. The disadvantage is that it is not possible to separate different contributing sources except sea-salt.

Using the EMEP model for base cation deposition

Leonor Tarrason, Met.no in Norway

Case study - The Nordic mapping of base cation deposition using data assimilation

Christer Persson, Swedish Meteorological and Hydrological Institute

A background document in form of the Nordic deposition mapping report is available on <http://asta.ivl.se>.

12.00-13.00 **LUNCH**

13.00-13.45 **Modelling base cation deposition from emission data and from air quality and wet deposition data – continued**

Discussion and conclusions regarding base cations in air, precipitation, throughfall and other monitoring data available on a European scale and methods possible to use for estimating deposition, how to deal with local deposition, sea salt deposition, model validation, etc.

13.45-15.00 **The inclusion of base cation deposition data into the mapping of critical loads**

Data on base cation deposition is important for studying the effects of acidification of soils and waters, since it, together with weathering, provides the ions for neutralising input of acidity. Also natural emissions play an important role for the overall input of base cations in Europe. Sea salt is of significant importance for the input of base cations along the European west coast and counteracts acidification in sensitive areas in particular in Northwestern Europe. Another important source, which is presently not well quantified is soil dust.

Need for data in the critical loads calculations and in calculating ecosystem recovery

Filip Moldan, IVL Swedish Environmental Research Institute

15.00-15.30 **COFFEE BREAK**

Discussion and conclusions regarding the need for data on base cation deposition, need for data accuracy, need for time periods to be used in dynamic modelling, the effect of accurate data in relation to available CL data, and the influence on the need for pollution abatement in protocols. Are there other important requirements e.g. on temporal and spatial scale and requirements due to model type used? Are there different needs for studying forest soils and surface waters and for steady-state and dynamic modelling.

15.30-17.00 **Working groups** to summarize recommendations on the data available, methods, models for the mapping of base cation deposition over Europe as input data to the Convention on Long-Range Transboundary Air Pollution

November 28

9.00-12.00 **Conclusions of the working group recommendations**

10.00-10.30 **COFFEE BREAK**

12.00 **Closing the workshop**

12.00- **LUNCH**