

How can background measurements be linked with urban air quality

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Outline:

- Introduction to CLRTAP and EMEP
- Monitoring strategy
- Methods and QAQC
- Scientific input

EXECUTIVE BODY

IMPLEMENTATION COMMITTEE

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Task Force

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Coordinating
Centre

ICP
Integrated Monitoring
Task Force

Programme
Centre

ICP
Modelling and Mapping
Task Force

Coordination
Centre for
Effects

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Materials
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Main Research
Centre

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Programme
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Waters
Task Force

Programme
Centre

Task Force
Health

EMEP

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Inventories and Projections

Centre for Emission
Inventories and Projections

Task Force on
Measurement and Modelling

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Meteorological Synthesizing
Centre-West

Meteorological Synthesizing
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WG STRATEGIES AND REVIEW

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Reactive Nitrogen

Task Force on
Heavy Metals

Network of Experts
on Benefits and
Economic Instruments

Expert Group on
Techno-economic Issues

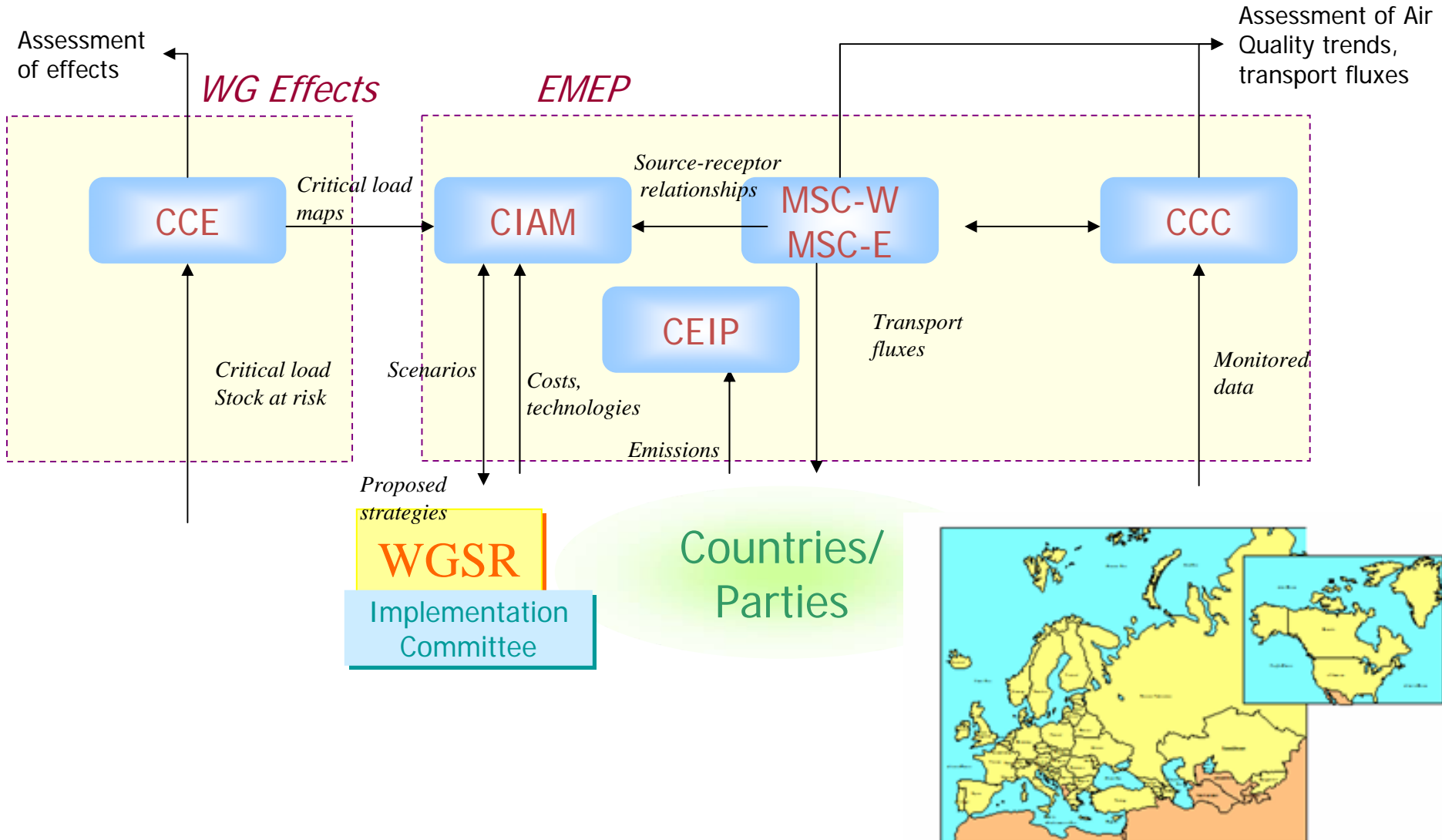
Task Force
on POPs

Expert Group on
Particulate Matter

+ eight legally binding protocols



The "operational system" of the Convention on Long Range Transboundary Air Pollution



1973



1977



1985



1995



1970-2010



EMEP/CHEM. - 3/77

November 1977

Replaces EMP 1/76

CO-OPERATIVE PROGRAMME FOR MONITORING
AND EVALUATION OF THE LONG RANGE
TRANSMISSION OF AIR POLLUTANTS IN EUROPE

M A N U A L
FOR SAMPLING AND CHEMICAL
ANALYSIS

EMEP/CCC - REPORT 2/78
DATE: AUGUST 1978

REPORT ON THE FIRST INTERCOMPARISON
OF ANALYTICAL METHODS WITHIN THE EMEP

BY

KARIN E. THRANE

EMEP/CCC - Report 4/79
DECEMBER 1979

ECE Co-operative programme for
monitoring and evaluation of the long
range transmission of air pollutants
in Europe

EMEP EXPERT MEETING ON
CHEMICAL MATTERS
OSLO, 3-5 DECEMBER 1979

www.emep.int

Convention on Long-Range Transboundary Air Pollution

emep

Co-operative programme for monitoring
and evaluation of the long-range
transmissions of air pollutants in Europe

EMEP/CCC Reports 1975-2010

Since 2000, EMEP/CCC reports are available as pdf or word files, prior to 2000 as scanned pdf documents.

A complete list of all EMEP reports, including those prepared by the other EMEP centers, can be found at www.emep.int/publications.html. Paper copies of reports prepared by EMEP/CCC will be sent on request. We kindly ask you to contact our library (library@nilu.no).



Reports available: [2010](#) - [2009](#) - [2008](#) - [2007](#) - [2006](#) - [2005](#) - [2000](#) - [1995](#) - [1990](#) - [1985](#) - [1980](#) - [1975](#)

Some basics

- Non existing standard methods
- Inclusive rather than exclusive approach
- Traceability and possibility to externally review performance
- Low concentrations and decadal trends
- Regional scale, → siting criteria
- Directly linked to emission inventories and chemistry transport modeling (process understanding)
- Meet needs of effects community
- Main actors were research institutes and NHMs
- "bottom up" regime, no strong legislation

EMEP Manual for Sampling and Analysis

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Chapter 6

First page 



English

[MS word](#) (zipped 3.5 MB)
[pdf](#) (2.2 MB)



Russian

[MS word](#) (zipped 2.3 MB)
[pdf](#) (2.7 MB)



Chinese

[pdf](#) (13 MB)

To be included in the EMEP Manual:

- Draft protocol for [EC/OC](#)
- Protocol for Low cost denuder measurements ([pdf](#) 0.6 MB, [MS Word](#) 13 MB)

Other relevant manuals:

- [WMO/GAW Aerosol Measurement Procedures, Guidelines and Recommendations](#) (report No153, pdf, 1 MB)
- [WMO/GAW Manual for the precipitation chemistry programme](#) (report No160, pdf, 1.9 MB)
- [ICP IM manual](#)
- [ICP Forest manual](#)

5. Quality assurance

General guidelines considering the quality assurance work within EMEP were given in the EMEP Quality Assurance Plan (EMEP/CCC-Report 1/88). While there have been considerable improvements in the quality assurance work within EMEP over the last years, there is still need for improvements. The EMEP/WMO workshop in Passau on accuracy of measurements (EMEP/CCC Report 2/94) gave a series of recommendations aiming at an improved quality assurance. These recommendations have been accepted by the EMEP Steering Body in 1994, and will form a basis for the QA programme within EMEP. Important steps in this programme are:

- Appointment of an EMEP QA Manager at the CCC, and a National QA manager in each of the participating countries. These will be responsible for implementing harmonized quality assurance systems within the countries, including documentation of standards and reference materials.
- Development of standardized operating procedures based on the recommendations in this Manual.
- Co-location experiments and instrument comparisons in the various countries to document precision and quantify internal network differences.
- Continuation of efforts towards site characterization.

It was also agreed to continue exchange of views and information with the WMO, since the WMO GAW network share a number of the stations and measured parameters. Since then further discussions have taken place between EMEP and WMO/GAW and there is a strong desire to harmonize and coordinate the efforts in order not to duplicate activities and efforts.

The implementation of the recommendations above will be a gradual process, starting with the establishment of responsible National QA managers.

Guidelines for the QA work are given in the following sections.

WMO Scientific Advisory Groups

- Aerosol
- Reactive gases (CO, NO_x)
- Precipitation Chemistry
- Greenhouse gases

Joint EMEP/GAW supersites (CREATE, EUSAAR, ACTRIS ++)

**EMEP-WMO Workshop on Strategies
for Monitoring of Regional Air Pollution
in relation to the need within EMEP,
GAW and other international bodies**

**Aspenäs Herrgård, Lerum, Sweden
June 2–4, 1997**

Edited by Jan Schaug and Karin Uhse

EMEP Co-operative Programme for Monitoring and Evaluation
of the Long-Range Transmission of Air Pollutants in Europe

The EMEP monitoring strategy 2004-2009

**Background document with justification and
specification of the
EMEP monitoring programme 2004-2009**

EMEP monitoring strategy 2010-2019



Economic and Social
Council

Distr.
GENERAL

ECE/EB.AIR/GE.1/2009/15
23 June 2009

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE
TRANSBOUNDARY AIR POLLUTION

Steering Body to the Cooperative Programme for Monitoring and
Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)

6. The EMEP observations and model calculations are important elements in establishing the air pollution situation in the United Nations Economic Commission for Europe (UNECE) region and provide links both to global and to urban scales. Air pollution is also addressed by other conventions, bodies and institutions. The EMEP Strategy for 2010–2019¹ discusses the links between EMEP observations and the information requirements of those other bodies.

(a) Sufficient ongoing long-term monitoring of concentrations and deposition fluxes to test the effectiveness of the Convention's protocols as well as other European policies;

(b) Adequate spatial coverage in new EMEP areas as well as in areas that have been insufficiently covered up to now;

(c) Sufficient temporal resolution that will allow investigation of atmospheric processes and model improvements as well as analysis of individual pollution events important in relation to human health and ecosystem impacts;

(d) Co-located and concurrent monitoring of all relevant components and adoption of standard methodologies and adequate quality assurance procedures;

(e) Conduct of monitoring in an affordable way for all Parties, particularly those with economic limitations, but at the same time in a way that takes advantages of the scientific development and emerging capabilities at the national level.

10. EMEP monitoring constitutes the core infrastructure for monitoring atmospheric composition change throughout the EMEP domain by ensuring adequate geographical coverage of monitoring efforts by Parties as well as by ensuring that these data can be combined with data generated outside the region. One of the key challenges is to understand the role of intercontinental transport of pollutants of short-lived species as well as long-lived species affecting the topics addressed by EMEP. EMEP observations contribute to the Global Earth Observation System of Systems (GEOSS). EMEP observations and monitoring sites are particularly well suited to serve as complementary sources of data to airborne and spaceborne remote sensing instrumentation, and it is expected that satellite data will towards the end of the coming strategic period provide essential information for addressing air pollution across the EMEP domain. The capabilities of satellites, however, will continue to rely on the reliable data for calibration and validation that EMEP observations contribute to.

11. EMEP monitoring should support, in an integrated way, information needs associated with the coupling between atmospheric composition and deposition rates with climate variability/change. These include radiative forcing agents with a significant regional gradient (e.g. aerosols and ozone) where transboundary fluxes of the agents and their source-receptor relationships need to be assessed. Secondly, the monitoring of long-lived greenhouse gases should be closely integrated with the traditional EMEP parameters, where relevant, with a view to further developing the monitoring programme defined for the strategic period of 2004–2009. Finally, the EMEP observation efforts should support the coupling between the carbon cycle and reactive nitrogen cycle.

12. EMEP monitoring constitutes the core capacity for observing atmospheric composition contributing to the evaluation of the regional contribution to local air pollution. This work is to be closely harmonized in the European Union member countries with the implementation of the Directive on Ambient Air Quality and Cleaner Air for Europe (Air Quality Directive). There is a need for additional sites that provide a comprehensive list of parameters in order to adequately describe the physical and chemical processes occurring during transport. The performance and spatial resolution of the EMEP models is expected to improve during the strategic period 2010–2019, and there is a potential for using urban background sites to support the EMEP work. It is recommended that EMEP develop the supporting monitoring capacity jointly with other forums and bodies that address local pollution issues.

13. Taking into account the complexity and costs of atmospheric composition monitoring, EMEP will, as far as possible, harmonize and make use of relevant data compiled under other networks.

15. The monitoring strategy of EMEP is to use progress in scientific understanding represented by new methods for the conduct of monitoring, new technologies and techniques to integrate observations from measurement platforms (e.g. in situ, profiles, remote sensing) and methods for integrating observational data with modelling efforts through, for example, data assimilation. EMEP will, where relevant and appropriate, introduce monitoring of parameters at a timeliness allowing more rapid access to data on the air pollution situation across the EMEP domain. EMEP will in collaboration with the European Environment Agency contribute to the provision of near-real time data for Global Monitoring for the Environment and Security (GMES) in agreement with the Parties. Such efforts will be based on voluntary contributions from Parties and will follow the guidance of the EMEP Steering Body.

Monitoring programme

(a) Level 1:

(i) Measurements at level 1 include parameters required to describe basic aspects of tropospheric chemistry and deposition rates of substances involved in the atmospheric cycling of particulate matter, photochemical oxidants, acidifying and eutrophying compounds and heavy metals, as well as their trends over time. Although it is not a formal requirement at level 1 sites, the EU Member States that have commitments under Directive 2008/50/EC are recommended to undertake the required background measurements at their existing EMEP sites rather than establish new sites for this purpose. Requirements at level 1 sites also include meteorological parameters, but these may be taken from an adjacent meteorological site, if representative;

(b) Level 2: measurements at level 2 sites include all parameters required at level 1 sites plus a series of additional ones. Such additional parameters could include high time resolution (by continuous methods), reliable gas/particle distribution information for semi-volatile nitrogen compounds, speciation of precursors to photochemical oxidants (nitrogen oxide (NO_x) compounds and volatile organic compounds (VOCs)), physical and optical characterization of aerosols (particulate matter 1 (PM₁) mass concentration, size number distribution, aerosol optical depth, light scattering and light absorption measurements), extended chemical speciation of particles (elemental and organic carbon, mineral dust), tracers to address air mass origin and the role of anthropogenic versus natural influence (carbon monoxide(CO), methane (CH₄) and halocarbons). For heavy metals, the level- 2 programme includes air concentrations of cadmium (Cd) and lead (Pb) (with copper (Cu), zinc (Zn), arsenic (As), chromium (Cr) and nickel (Ni) as a secondary priority) and mercury (Hg) in air and precipitation. POPs monitoring is mandatory in level 2 and should include measurements both in air and in precipitation. Not all parameters listed above are required, however, to comply with the level 2 “supersite” requirements. Many of these observations are available as a result of research efforts undertaken at EMEP sites, and are typically funded from other sources than from national EMEP monitoring budgets.

(c) Level 3: Level 3 measurements are research-driven and may partly be available at locations other than level 1 and level 2 sites. The research measurements at level 3 need to respond to the EMEP monitoring objectives and challenges. Interesting parameters for EMEP include: (i) dry deposition flux measurements (sulphur, nitrogen, ozone, VOCs, Hg, others); (ii) vertical profiles of ozone and aerosols (soundings or lidar); (iii) Hg speciation (total gaseous mercury (TGM), reactive gaseous mercury (RGM), total particulate mercury (TPM)); (iv) congener specific POPs (polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs)); (v) observations of POPs and Hg in other compartments than in the atmosphere, to be obtained through collaboration with other relevant bodies and institutions; (vi) chemical speciation of organic carbon (OC) in aerosols, including also carbon dioxide (CO₂) and nitrous oxide (N₂O) measurements made at EMEP sites in association with other monitoring frameworks; and (vii) isotope information on OC and VOCs. Other parameters may be added to this list as they become relevant for EMEP.

+ intensive campaigns (collaboration with EUCAARI, NitroEurope, others)



WMO Global Atmosphere Watch World Data Centre for Aerosols



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December 14, 2010

The World Data Centre for Aerosols (WDCA)

is the data repository and archive for microphysical, optical, and chemical properties of atmospheric aerosol of the [World Meteorological Organisation's \(WMO\) Global Atmosphere Watch \(GAW\)](#) programme.

"The goal of the Global Atmosphere Watch (GAW) programme is to ensure long-term measurements in order to detect trends in global distributions of chemical constituents in air and the reasons for them. With respect to aerosols, the objective of GAW

GAW Links

[WMO Global Atmosphere
Watch - GAW](#)

[GAW Scientific Advisory Group
for Aerosol](#)

[GAW Station Information
System - GAWSIS](#)

[World Calibration Centre](#)

"Supersite data" in Near-Real time

Framework [47] ⓘ
EUSAAR_preliminary
GAW-WDCA
GAW-WDCA_NRT
GAW-WDCA_preliminary
GAW-WDCGG
GEOmon
HELCOM

Country [14]
>>All
Australia
Czech Rep.
France
Germany
Hungary
Ireland

Station [22] ⓘ
>>All
Alice Springs
Barrow
Birkenes
Bondville
Cabauw
Cape Point

Matrix [4] ⓘ
>>All
aerosol
instrument
pm1
pm10

Instrument type [6] ⓘ
>>All
dmeps
MAAP
nephelometer
PSAP
smeps
sun_tracking_filter_radiometer

Component [25] ⓘ
>>All
aerosol_absorption_coefficient
aerosol_absorption_coefficient_statistics
aerosol_light_backscattering_coefficient
aerosol_light_backscattering_coefficient_statistics
aerosol_light_backscattering_coefficient_zero
aerosol_light_rayleighscattering_coefficient_zero

From >>All To >>All

Available datasets: 1353
Reset List datasets

Map (Populate) (Show large)



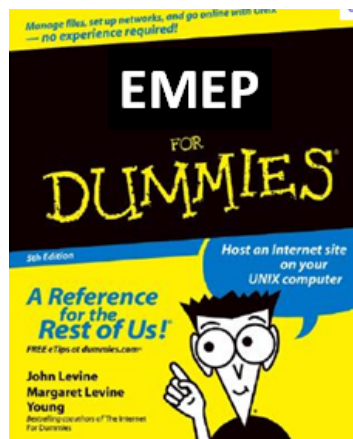
Additional Resources

- Air mass trajectories
- Measurement network (EMEP)
- Measurement network (GAW)
- Site descriptions
- Data submission
- EMEP/CCC reports
- Presentations
- Quality assurance
- EMEP manual
- EMEP laboratory intercomparisons
- TFM
- HTAP
- Measurement programme/strategy (pdf)
- Contact persons

Final remarks

EMEP vs AirMonTech

- Contribute towards common methodologies where appropriate
- Identify limitations in air quality reference methods for background monitoring



For more questions: www.emep.int
kt@nilu.no