

CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION
Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of
Air Pollutants in Europe (EMEP)

SECOND EMEP EXPERT MEETING ON INTERCOMPARISON OF POP
MODELS

Moscow, Russia, 10-11 December 2003

MINUTES

Introduction

POP model intercomparison study was initiated under EMEP in accordance with the recommendation of the Executive Body for the Convention on Long-Range Transboundary Air Pollution [*ECE/EB.AIR/75*]. The necessity of carrying out such intercomparison was also stressed at the OECD/UNEP Workshop on the Use of Multimedia Models for Estimating Overall Environmental Persistence and Long-Range Transport held in Ottawa in 2001 [*ENV/JM/MONO(2002)15*].

The main aim of POP model intercomparison is the exchange of knowledge and experience between different scientific groups working in the field of assessment of POP environmental pollution. Moreover, such intercomparison study is able to increase the transparency of existing POP models and their results; to harmonize the output of POP models of different types and complexity for obtaining comparable results at different levels of regulatory activities; and to consider model approaches for evaluation of new substances.

Discussion of POP model intercomparison issues was conducted during the third EMEP/TFMM meeting in Geneva (Switzerland), March 2002 [*EB.AIR/GE.1/2002/4*]. A draft programme of the intercomparison study including its time-schedule was agreed at the first meeting on the intercomparison (Moscow, Russia November 2002).

The second meeting was convened in Moscow, Russia from 10 to 11 December 2003 (Agenda is attached).

The meeting was attended by 15 experts from Canada, Germany, Japan, the Netherlands, Norway, Switzerland, the United Kingdom, the USA and representatives of EMEP/MSC-E. (List of participants is attached).

The meeting was chaired by Dr. V. Shatalov (EMEP/MSC-E), who led the discussion on the comparison of results of Stage I; Dr. A. Sweetman (Lancaster University, the United Kingdom) led the discussion on a draft report of Stage I; and Dr. S. Gong (Air Quality Research Branch, Canada) led the discussion on work programme of Stage II.

Objectives

- to consider results of computational experiments performed by modelers in the framework of Stage I;
- to elaborate an extended work programme and time-schedule of Stage II.

Outcome

1. Stage I

Results of Stage I of POP model intercomparison reported at the meeting were judged to be of high interest of modeling community. However, additional calculations were recommended to be done. It was agreed:

MSC-E's responsibility

- to specify an output protocol (a number of tabular templates on each experiments to be filled in), in particular:
 - to add new numerical experiments on air-water and air-vegetation exchange;
 - to revise input data on experiments concerning dry and wet depositions and gaseous exchange with different types of underlying surfaces, namely:
 - to specify precipitation rate and precipitation height as input data for evaluation of wet deposition;
 - to give gaseous concentrations in the atmosphere as an input data for all calculation experiments on gaseous exchange processes.
- to send out the output protocol to all participants by the end of December 2003.

All participants' responsibility

- to refine calculations and to specify the conditions under which the results were obtained (including the values of pollutant-specific parameters used in calculations):
 - to present values of dry deposition velocities used in individual models for description of dry deposition process in addition to fluxes;
 - to carry out calculation experiments on the basis of physical-chemical data set of the individual model (if possible);
 - to perform steady-state calculations for gaseous exchange processes (dynamic as optional);
 - to make calculations of concentrations and/or fluxes from and to underlying surface for all calculation experiments on gaseous exchange processes;
 - to present time trends of soil concentrations at the accumulation stage and at the clearance stage for at least 120 months (optional);
- to send out the results of additional calculations mentioned above to MSC-E by the end of February 2004;

The meeting discussed in depth a draft report on the results of Stage I and proposed the following:

- to make several editorial amendments (MSC-E);
- to fill in and to check the table with overview of models in Chapter 1 (all participants);

- to provide MSC-E with a short description of basic processes of individual models to include them to Chapter 4 (all participants);
- to remove all measurement values from input data sets (MSC-E);
- to remove quality parameter from statistical evaluation of the results (MSC-E);
- to finalize the report by the end of March 2004 (MSC-E and all participants);
- to prepare information note on preliminary results of Stage I for its publication by the end of April 2004 (MSC-E and all participants).

2. Stage II

The meeting agreed to combine Stages II and III of the intercomparison study. PCB-153 was chosen as the main pollutant to be considered within Stage II. For other selected pollutants (PCB-28 and PCB-180), it was proposed to carry out computational experiments on the voluntary basis. This stage focuses on the following:

- Sensitivity study with respect to basic processes will imply:
 - calculation experiments formulated at Stage I and carried out with the use of “reference data set” and/or physical-chemical data set of the individual model;
 - additional experiments on wet deposition process for some episodes and comparison of their results with measurements.
- Comparison of mass balance estimates (annual and monthly means) calculated with the use of physical-chemical data set of the individual model. Results will include:
 - values of PCB mass in compartments (atmosphere, soil, water, vegetation, sediments);
 - mass of PCB degraded in these compartments;
 - mass flow of PCB transported in/out of the specified domain: inflow and outflow (for each transport media as optional);
 - mass flow of PCB transported from one compartment to another in both directions (dry and wet deposition, gaseous exchange);
 - concentrations at each interface (pg/m³, pg/l, ng/g, for air, water and soil, respectively);
 - spatial distributions of concentrations in different compartments (optional).
- Sensitivity study with respect to mass balance (above calculations of mass balance estimates carried out with the use of “reference data set”).

The participants also offered:

- to clarify volume of each compartment used in the model;
- to fix the following coordinates of calculation domain at Stage II: 35° N – 70° N; 10° W – 30° E;

- to prepare description of the domain (land cover data, leaf area index, distribution of organic content in soil) and initial concentrations in media (by MSC-E);
- to fix period of calculations as 2000;
- to provide spatial distribution of emission data for 2000 and historical emissions with resolution 1°by 1° over all Northern Hemisphere (by Sunling Gong);
- to provide measurement data for comparison with computational results (by Knut Breivik);
- to prepare program of additional experiment on wet deposition process (by Gerhard Petersen);
- to perform two versions of calculations – with zero initial and boundary conditions for modeling domain (first priority) and with given initial concentrations (optional);
- to send out results of calculation experiments on Stage II by the end of May.
- to held the third EMEP meeting on POP model intercomparison study in Moscow in August 2004.