



**Economic and Social
Council**

Distr.
GENERAL

ECE/EB.AIR/GE.1/2007/12
22 June 2007

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)

Thirty-first session
Geneva, 3–5 September 2007
Item 4(h) of the provisional agenda

HEMISPHERIC TRANSPORT OF AIR POLLUTION

Report by the Co-Chairs of the Task Force on Hemispheric Transport of Air Pollution

INTRODUCTION

1. This report summarizes the activities of the Task Force on Hemispheric Transport of Air Pollution held in accordance with the workplan of the Executive Body (ECE/EB.AIR/GE.1/2006/10, item 2.4, as adopted by the Executive Body at its twenty-third session (ECE/EB.AIR/89, para. 72). It is divided into four parts. Part I is a report of a workshop on emission inventories and projections for assessing intercontinental transport, which took place from 18 to 20 October 2006 in Beijing. Part II is a report of a workshop, held jointly with the World Meteorological Organization (WMO) and in coordination with the Group on Earth Observations (GEO) secretariat, on integrated observations for assessing hemispheric air pollution, which took place in Geneva from 24 to 26 January 2007. Part III is a report of the third meeting of the Task Force held in Reading, United Kingdom, from 30 May to 1 June 2007. The proposed 2008 workplan for the Task Force is given in part IV.

GE.07-23103

2. Further details of the workshops and the third Task Force meeting may be found at <http://www.htap.org>.

I. WORKSHOP ON EMISSION INVENTORIES AND PROJECTIONS FOR ASSESSING INTERCONTINENTAL TRANSPORT

3. This workshop was organized by the Task Force and hosted by Tsinghua University, Beijing.
4. The workshop was attended by 80 experts from nine Parties to the Convention: Canada, Denmark, the European Community, Italy, the Netherlands, Norway, Spain, the United Kingdom of Great Britain and Northern Ireland and the United States of America, as well as experts from Cambodia, China, Egypt, India, Japan, Mexico, Pakistan, the Philippines, and Thailand.
5. Representatives from the Intergovernmental Panel on Climate Change (IPCC), WMO, the European Commission's Joint Research Centre (JRC), and GEO, as well as from the EMEP centres, the Meteorological Synthesizing Centre-East (MSC-E), the Meteorological Synthesizing Centre-West (MSC-W), the Chemical Coordinating Centre (CCC) and the Centre for Integrated Assessment Modelling (CIAM) also attended. The secretariat was also represented.
6. Mr. T. Keating (United States) and Mr. A. Zuber (European Community), Co-Chairs of the Task Force, chaired the workshop.

A. Workshop objectives

7. The aims of the workshop were to:
 - (a) Identify the state of knowledge of air pollution emissions and emission projections relevant for understanding intercontinental transport;
 - (b) Evaluate the availability, consistency, and uncertainty in current emissions information for different regions of the Northern Hemisphere and different emission sectors;
 - (c) Provide guidance on how emissions might be assessed in different parts of the Hemisphere;
 - (d) Evaluate the adequacy of existing global emission projections for the assessment of intercontinental transport in the Northern Hemisphere;

(e) Identify methods and sources of information for improving global emission projections for the assessment of hemispheric transport and to identify relevant areas for future research;

(f) Provide a basis for consensus on the emission inventories and projections to be used for the assessment of hemispheric transport of air pollution.

B. Summary of recommendations

8. The workshop sessions on the status of global and regional emissions inventories and evaluation of inventories using observations recommended that:

(a) In the assessment of intercontinental transport of air pollution, the Task Force make use of existing global emission inventories (e.g. Emission Database for Global Atmospheric Research (EDGAR), United Nations Framework Convention on Climate Change (UNFCCC), the EMEP GAINS model, REanalysis of the TROpospheric chemical composition over the past 40 years (RETRO model)) and should work, in coordination with other efforts (e.g. the Task Force on Emission Inventories and Projections, EDGAR, GAINS, Global Atmospheric Pollution Forum (GAPF), Acid Deposition Monitoring Network for East Asia (EANET), Clean Air Initiative for Asian Cities (CAI-Asia)), to facilitate the inclusion of information from national or regional emissions inventories with local knowledge. Also, research programmes or groups could contribute to the collection of emission inventories on the global scale, particularly for specific sources such as shipping and aviation emissions or the emissions from lightning. Such cooperative efforts were needed to improve emissions inventories in regions or for source categories where emission factors and activity data were poorly known.

(b) The Task Force make an effort to compile emission factors and source-testing information for sources not covered by existing emission factor databases and guidance documents. This compilation could be used by the community to improve emission estimates and could be done in cooperation with other efforts (e.g. GAPF, Task Force on Emission Inventories and Projections, IPCC, EANET, and CAI-Asia).

(c) The Task Force's modelling efforts help identify the emissions estimates and uncertainties that are most important for understanding intercontinental transport and hemispheric pollution and the temporal and spatial resolution of emission estimates needed to understand intercontinental source-receptor relationships. Modelling sensitivity studies should address both point sources and area sources at a regional scale. In addition to initiatives under the Task Force, other field studies and laboratory tests, designed to assess emission factors and activity data, would continue to increase our understanding and reduce uncertainties.

(d) The Task Force should further explore efforts to facilitate the integration of emissions, observations, and modelling information at the January 2007 workshop.

(e) Further capacity-building and improved data packaging is needed before satellite observations can be used widely to inform emissions inventory development. The Task Force can be an advocate for such efforts.

(f) Further capacity-building might also be necessary in the area of surface and in situ observations, especially for chemical speciation measurements.

9. The workshop session on future emission scenarios and projections recommended that:

(a) The Task Force takes into account other efforts to develop future emission projections, including efforts by Governments, the Task Force on Emission Inventories and Projections, UNFCCC (e.g. national communications), IPCC (e.g. AR5 preparation), the GAINS model, the Organisation for Economic Co-operation and Development (OECD), the European Commission project Quantifying the Climate Impact of Global and European Transport Systems Union (QUANTIFY), and others.

(b) The Task Force focuses on improving inclusion of international shipping and aviation emissions, which are not covered well by national inventories, in future emissions projections, with benefits to the broader community.

(c) The Task Force identifies the magnitude and distribution (spatial, vertical, temporal and chemical) of expected emissions changes from available projections, and evaluate how these types of change will alter estimates of source-receptor relationships on intercontinental and hemispheric scales.

(d) The Task Force explores the uncertainty and bias in the projections and scenarios in order to get a view of a fuller range of possible futures.

(e) As consideration of feasibility and cost-effectiveness of measures play an important role regarding the further assessment of policy options to reduce intercontinental transport of air pollution, the Task Force includes such considerations of feasibility and costs in the assessment of future emission scenarios (e.g. by generating a maximum feasible reduction scenario or characterizing the distribution of marginal costs).

(f) The Task Force works with other existing efforts to develop capacity and improve the projection methods, information exchange and transparency of future projections.

10. The workshop session on the emission inventories for air quality management and public information recommended that:

(a) The Task Force assists in raising awareness of transboundary and intercontinental air pollution in regions where this is less well known, and in linking this awareness to the need for developing regional and global emissions inventories.

(b) The Task Force assists in creating crucial links between institutions (including national focal points, regulatory bodies, and research groups), both within countries and across regional and hemispheric scales. These linkages could be an important step in meeting the need for increased capacity.

II. WORKSHOP ON INTEGRATED OBSERVATIONS FOR ASSESSING HEMISPHERIC AIR POLLUTION

11. This workshop was jointly organized by the Task Force and WMO and in cooperation with the GEO secretariat.

12. The workshop was attended by nearly 120 experts from 19 Parties to the Convention: Austria, Canada, the Czech Republic, Denmark, the European Community, France, Germany, Ireland, Italy, Kazakhstan, Lithuania, Norway, Poland, Portugal, Russia, Spain, Switzerland, Netherlands, the United Kingdom and the United States, as well as experts from China, Egypt, India, Japan, Malaysia, Nigeria, Pakistan, and Thailand.

13. Representatives from WMO, JRC, GEO, European Centre for Medium-Range Weather Forecasting (ECMWF), MSC-E, MSC-W and CCC, also attended. The secretariat was also represented.

14. Mr. T. Keating (United States) and Mr. A. Zuber (European Community), Co-Chairs of the Task Force, chaired the workshop.

A. Workshop objectives

15. The aims of the workshop were to:

(a) Take stock of the current state of surface-based, aircraft and satellite observations relevant to: (i) hemispheric transport studies supporting the 2007 and 2009 assessments being conducted by the Task Force, (ii) WMO weather, climate and environmental prediction applications, and (iii) to the Societal Benefit Areas of GEO;

(b) Determine the gaps in observations for priority air pollutants and in data management, and make recommendations on how to fill them, taking into account ongoing efforts under regional networks such as EMEP, the North American Consortium for Atmospheric Research in Support of Air-Quality Management (NARSTO), EANET, the Global Atmospheric Watch (GAW) and the Integrated Global Atmospheric Chemistry Observations (IGACO) programmes, as well as the development of the Global Earth Observation System of Systems (GEOSS);

(c) Identify ways to produce a common database of observations suitable for evaluation of models and inventories for priority air pollutants, such as ozone and particulate matter and their precursors;

(d) Recommend steps needed to create cooperative structures between regional observation networks and other sources of data;

(e) Identify short- and long-term efforts that will improve the information technology infrastructure for sharing relevant observational data and integrating observational data with modelling for purposes of evaluation and improved data assimilation for air quality forecasting;

(f) Further encourage the participation of developing countries in long-range air pollution observation systems.

B. Summary of recommendations

16. The workshop recommended that:

(a) The Task Force, EMEP, EANET, WMO, and GEO work to maintain and expand the observation of air pollution concentrations and composition, through routine networks, intensive field campaigns, and satellite observation, to better understand the sources and transport of air pollution. Particular attention should be paid to:

- (i) Regions poorly covered by current systems, including the Arctic, Central Asia and remote oceans;
- (ii) Financing of long-term monitoring on remote islands and mountain tops, and using aircraft and satellites;
- (iii) Support observations of vertical profiles from sondes, ground-based remote sensors, satellites and aircraft;

(b) Observed trends, such as ozone time series from remote sites, should be compared to modelling of long-term changes in emissions and chemical and atmospheric processes;

- (c) The Task Force's assessments of hemispheric transport address concepts complementary to model-derived source-receptor relationships, including source contribution analysis from observations and models and objective assimilation techniques;
- (d) Further efforts be made to understand better the processes relevant for long-range transport of air pollution, such as the processes leading to the transport of air pollutants from the middle troposphere into the boundary layer and to the surface;
- (e) The Task Force revisits the observational evidence of intercontinental transport of air pollution at later meetings. Given the focus of the current meeting on ozone and ozone precursors, attention should also be paid to the role of long-range transport of particulate matter (PM), mercury (Hg) and persistent organic pollutants (POPs);
- (f) The Task Force works towards making multiple types of observational data of known quality available in common formats for the purpose of evaluating models used in the assessment of hemispheric transport of air pollutants;
- (g) The Task Force designs benchmarking criteria for the evaluation of models and characterization of uncertainty in the assessment of intercontinental transport and hemispheric pollution;
- (h) WMO/GAW, GEO, EMEP, EANET and national administrations work to create and extend the interoperability of regional and national monitoring networks and to improve the links to the various user communities of atmospheric composition information;
- (i) The Task Force, jointly with EMEP activities and in coordination with other efforts such as WMO, GEO, EANET and the International Geosphere-Biosphere Programme (IGBP) - World Climate Research Programme (WCRP) Atmospheric Chemistry and Climate Initiative, work to develop and promote standards and conventions to improve interoperability and data comparability. In addition, transparent and complete documentation of data quality assurance/quality control (QA/QC) should be promoted, so that the comparison can be made with known quantities and quality.

III. THIRD MEETING OF THE TASK FORCE ON HEMISPHERIC TRANSPORT OF AIR POLLUTION

17. The third meeting of the Task Force was held in Reading, United Kingdom, from 30 May to 1 June 2007; it was hosted by the United Kingdom.

18. It was attended by more than 60 experts from the following Parties to the Convention: Canada, the Czech Republic, Denmark, the European Community, Finland, France, Germany, Hungary, Italy, the Netherlands, Norway, Russian Federation, Spain, Sweden, the United Kingdom and the United States. An expert from Uzbekistan also attended. From outside the UNECE region, experts from Cambodia, Egypt, Japan and Thailand participated.

19. Representatives of European Centre for Medium-range Weather Forecasts (ECMWF), JRC, WMO, GEO secretariat and the Arctic Monitoring and Assessment Programme (AMAP) attended. Representatives from EMEP's CIAM, CCC and MSC-E also attended.

20. Mr. M. Williams of the United Kingdom Department of Environment, Food and Rural Affairs, Chairman of the Convention's Executive Body, opened the meeting. The meeting was co-chaired by Mr A. Zuber (European Community) and Mr. T. Keating (United States).

21. The aims of the Task Force meeting were to:

(a) Inform the Task Force on major findings and recommendations from the workshops organised by the Task Force;

(b) Inform the Task Force of the progress of the hemispheric transport of air pollution (HTAP) model intercomparison and discuss its continued efforts in 2008 and 2009;

(c) Discuss the links between the air quality, intercontinental or hemispheric transport of air pollutants, and climate change and how these linkages should be addressed by the Task Force;

(d) Present and discuss the content and conclusions of the draft of the Task Force 2007 interim assessment report that was to inform the review of the Gothenburg protocol on the significance of intercontinental transport for ozone, fine particles, and acidifying deposition;

(e) Reach agreement on the executive summary of the same report;

(f) Plan for the Task Force activities for 2008 and 2009.

A. Review of progress since second Task Force meeting

22. The Co-Chairs of the Task Force provided an overview of the Convention and an overview of the aims and outcomes of the workshop held in Beijing in October 2006. The representative of WMO gave an overview of the main conclusions and recommendations made

in the joint Task Force-WMO workshop held in Geneva in January 2007. Mr. M. Schultz (Germany) and Ms. C. Textor (France) gave an overview of the design and progress of the HTAP model intercomparison, set up to improve understanding of the importance of intercontinental transport.

23. The Task Force took note of the recommendations of the workshops and the progress made on the HTAP model intercomparison. The Task Force emphasized the need to include further regional chemical transport models in the HTAP model intercomparison in the next sets of experiments as this allowed for more detailed understanding of regional processes and improved the robustness of the results.

B. Climate change and intercontinental transport of air pollution

24. Ms. R. Doherty (United Kingdom), Ms. L. Mickley (United States), Mr. R. Derwent (United Kingdom), Mr. H. Nakane (Japan) and Mr. A. Abou Elseoud Ahmed (Egypt) identified some of the key policy-relevant science questions related to the relationship between classical air pollutants and climate change. The Task Force took note of the potential interactions between climate change and the intercontinental transport of air pollution. It further noted that there was a need to address these linkages in future meetings and assessment activities.

C. 2007 Interim Assessment Report

25. The aim of the 2007 interim report was to inform the Convention in its review of the Gothenburg Protocol. It was planned to provide the report in draft form to the EMEP Steering Body in September 2007 and to the Executive Body in December 2007. A printed report by UNECE in its Air Pollution series was planned for the beginning of 2008. The executive summary of the report would be an official document to the EMEP Steering Body.

26. The individual draft chapters of the 2007 interim report were presented to the workshop by one of the chapter lead authors.

27. The Task Force discussed each chapter individually and the report as a whole. It was agreed that substantial and new information on the significance of intercontinental transport of air pollution had been provided through the analysis of published studies and through the HTAP model intercomparison. It was recommended that some further editing and harmonization should still be done to improve the readability and to add information on issues that had been insufficiently covered to understand the key messages.

28. The Task Force agreed that additional comments on the report could be given until 1 July 2007. Those comments would be considered for the editing of the revised draft to be provided to the EMEP Steering Body and the Executive Body.

29. Mr. Keating presented the draft executive summary of the report to be submitted as an official document to the EMEP Steering Body (ECE/EB.AIR/GE.1/2007/13). The draft executive summary of the report was discussed in detail. The Task Force participants proposed changes to the text to convey better the key messages of the interim report. The Task Force asked the Co-Chairs to take these proposals into account when finalizing the executive summary.

30. The Task Force emphasized the importance of using the 2007 interim report and its executive summary to inform the Convention and other interested parties, such as individual experts, research organizations and Governments, about the findings of the Task Force.

D. Planning for the 2009 assessment report

31. The Co-Chairs of the Task Force presented an overview of some of the lessons learned in the drafting and review of the 2007 interim report. The Task Force took note of the positive aspects of the cooperation between the Task Force and the EMEP centres, experts from within and outside the UNECE, and organizations concerned with air pollution worldwide. It also took note of the open and transparent process that had led up to the draft interim report and the draft executive summary. The Task Force noted that further lessons would arise as the report was disseminated.

32. The process leading up to the 2009 assessment report should continue to address the policy-relevant science questions of the Task Force, but might have to make priorities of such issues that need to be addressed in more detail in the 2009 assessment. Challenges for the 2009 assessment included how to continue to involve the different experts and organizations, how to find effective ways of drafting and reviewing the report, and how to ensure timely delivery of the results for the benefit of the Convention. A further challenge lay in having an assessment that covered all pollutants of relevance for the Convention, including also mercury (Hg) and persistent organic pollutants (POPs).

33. The Task Force emphasized the need for further outreach activities to prepare the 2009 assessment and to allow for flexibility in the time of delivery. The Task Force recommended that the addition of Hg and POPs into the 2009 report should be performed in such a way as to avoid diluting the information that would be available that was relevant to ozone and fine particles. This might require writing a single modular or several separate documents.

E. Other Issues

34. The Task Force emphasized the need for the Parties to proactively engage with the Task Force. In particular, the HTAP model intercomparison should include regional models in future experiments, and Parties should be encouraged, through the EMEP Steering Body, to participate in those aspects of the HTAP model intercomparison in 2007, 2008, and 2009.

35. The Task Force also emphasized that the possibility for future assessment of both regional and hemispheric air pollution critically depended on observations both from space and from ground. The EMEP Steering Body should be made aware of the lack of plans to launch future satellites to provide information on air pollution and that appropriate initiatives should be taken to ensure such observations. Furthermore, the Steering Body should consider efforts that could be taken, in coordination with WMO, GEO, and other regional efforts, to strengthen the global air pollution observational system as a whole.

IV. DRAFT WORKPLAN FOR 2008

36. Main activities and time schedule:

(a) Prepare for the 2009 assessment report on intercontinental transport of air pollution for all the pollutants of concern of the Convention;

(b) Work further on the policy-relevant science questions identified by the first meeting of the Task Force;

(c) Continue the HTAP model intercomparison and model evaluation exercise;

(d) Continue the work on an integrated observation system relevant for the assessment of intercontinental transport of air pollution, including the development of intercomparison tools and information infrastructure, an observational database for model evaluation as well as improved emission inventories;

(e) Continue cooperation with the EMEP centres and individual Convention task forces, including the Task Force on Measurement and Modelling and the Task Force on Emission Inventories and Projections;

(f) Continue outreach efforts directed at experts in countries outside the UNECE region;

(g) Hold the fourth Task Force meeting in February or March 2008, tentatively in the United States;

(h) Hold a workshop on assessing intercontinental transport of air pollution by Hg and POPs in May or June 2008, tentatively in Rome;

(i) Hold a workshop to reach out to regional air pollution work in Asia in the fall of 2008;

(j) Report on these activities to the thirty-second session of the Steering Body to EMEP in September 2008.
