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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**

Thirty-eighth session

Geneva, 15–17 September 2014

Item 6 (d) of the provisional agenda

**Progress in activities in 2014 and future work:
hemispheric air pollution**

Hemispheric transport of air pollution

**Report prepared by the co-Chairs of the Task Force on Hemispheric
Transport of Air Pollution**

Summary

The Task Force on Hemispheric Transport of Air Pollution under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) carries out the tasks specified in its mandate (ECE/EB.AIR/106/Add.1, decision 2010/1), as well as those attributed to it in the current workplan for implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/122/Add.2, items 1.6.1–1.6.7). In line with these mandates, the Task Force continues to develop and implement a multi-year workplan to improve scientific understanding of the intercontinental transport of air pollution in the Northern Hemisphere and to evaluate the availability of mitigation strategies inside and outside the geographic scope of the Convention.

In accordance with the Convention's workplan, the Task Force is requested to present an annual report to the EMEP Steering Body. The present report therefore provides such a report, updating the Steering Body on the progress made by the Task Force since its previous report and providing an overview of upcoming activities through 2015.

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I. Progress in implementation of the 2012–2016 workplan

1. The Task Force on Hemispheric Transport of Air Pollution under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) is continuing to develop and implement its 2012–2016 workplan, which is outlined on the Task Force website.¹ The workplan is divided into approximately 35 work packages organized into six thematic areas: (1) emissions inventories and projections; (2) global and regional modelling of source receptor relationships; (3) model to observation evaluation and process studies; (4) impacts on health, ecosystems and climate change; (5) impacts of climate change on air pollution transport; and (6) data network and tools.

2. Under Theme 1 of the workplan, the Task Force released a new global anthropogenic emissions mosaic for 2008 and 2010, known as HTAPv2, for use in the HTAP2 coordinated modelling experiments in late 2013. The global data set was compiled as a mosaic of existing detailed regional scale inventories developed by EMEP and the Netherlands Organisation for Applied Scientific Research (TNO)² for the Monitoring Atmospheric Composition and Climate (MACC) project³ for Europe, by the United States Environmental Protection Agency (US EPA) for North America and by Tsinghua University for the Model Inter-Comparison Study for Asia⁴ (MICS-Asia) Phase III inventory including the Multi-resolution Emission Inventory for China (MEIC) project⁵ and the Regional Emission inventory in ASia (REAS) inventory,⁶ gap-filled for the remaining areas with Emissions Database for Global Atmospheric Research (EDGAR) database.⁷ The mosaic was compiled by a team led by the European Union's Joint Research Centre with contributions from Canada, China, Japan, the Netherlands, the Republic of Korea and the United States of America. This inventory is used by the following regional modelling exercises: North American/European Air Quality Model Evaluation International Initiative⁸ (AQMEII) covering North American and European domains, and MICS-Asia covering an East Asian domain. A report documenting the global data set with methodology and argumentation of choices of original data and with analysis of the geospatial pattern for the global inventory is currently undergoing expert review and will be made available in late 2014. The HTAPv2.2 data are available online for download⁹ as well as through the Global Emissions Initiative's Emissions of atmospheric Compounds and Compilation of Ancillary Data (ECCAD) portal.¹⁰

3. On 5 and 6 December 2013 the Task Force held a workshop to launch the new round of cooperative global and regional modelling experiments focused on the 2008–2010 time period outlined in Theme 2 of the Task Force workplan. The workshop was hosted by the US EPA regional office in San Francisco directly preceding the American Geophysical Union's 2013 Winter Meeting. More than 50 experts attended the meeting in person with another 30 experts participating in portions of the meeting via web conferencing. The experts attending in person included individuals from Canada, China, the Czech Republic,

¹ See <http://www.htap.org>.

² See <https://www.tno.nl/index.cfm?Taal=1>.

³ See <https://www.gmes-atmosphere.eu/>.

⁴ See <http://www.acap.asia/adorc/mics.html>.

⁵ See <http://www.meicmodel.org/>.

⁶ See <http://www.jamstec.go.jp/frsgc/research/d4/emission.htm>.

⁷ See <http://edgar.jrc.ec.europa.eu/>.

⁸ See <http://aqmeii.jrc.ec.europa.eu/>.

⁹ See http://edgar.jrc.ec.europa.eu/htap_v2/index.php?SECURE=123.

¹⁰ See <http://eccad.sedoo.fr>.

Denmark, France, Germany, India, Italy, the Netherlands, Norway, Pakistan, the Republic of Korea, Spain, Sweden, Thailand, the United Kingdom of Great Britain and Northern Ireland and the United States, as well as representatives of the Meteorological Synthesizing Centre West, the Meteorological Synthesizing Centre East and the European Union's Joint Research Centre. One of the main objectives of the meeting was to review the modelling experiment input and output specifications, the development of which has been coordinated by the Joint Research Centre and is documented on the Task Force website/wiki.¹¹ The presentations from the meeting are available on the Task Force website.¹²

4. During the December workshop, the Meteorological Synthesizing Centre East reported on progress on modelling of intercontinental transport of mercury and persistent organic pollutants for present day (2010) conditions that was performed in coordination with the Global Mercury Observations System (GMOS) project.¹³

5. In the first half of 2014, the four global modelling groups participating in the Task Force performed a series of core simulations from the matrix of HTAP2 experiments. The participating modelling groups are from Japan, the Republic of Korea, the United Kingdom, and the United States. The outputs of these models have been made available to the regional modelling communities participating in AQMEII and MICS-Asia for defining boundary conditions for regional simulations consistent with the global HTAP2 experiments.

6. Under Theme 6 of the Task Force's workplan, the Meteorological Synthesizing Centre West, in conjunction with their repository for the Aerosol Comparisons between Observations and Models (AeroCom) model intercomparison,¹⁴ has established a data repository for global and regional modelling outputs from the HTAP2 multi-model experiments. The Chemical Coordinating Centre has also extended their database of observational data for use in evaluating the HTAP2 experiments.

7. Under Theme 4 of the Task Force's workplan, members of the Task Force worked with the Chair of the Joint Task Force on the Health Aspects of Air Pollution to organize a World Health Organization (WHO) expert meeting on methods and tools for assessing the health risks of air pollution at the local, national and international levels in Bonn, Germany, on 12 and 13 May 2014. The meeting was intended to provide advice to a variety of health risk assessment efforts, including but not limited to the work of the two Task Forces as well as the Climate and Clean Air Coalition (CCAC). The discussions at the meeting focused on lessons that may be learned from the Global Burden of Disease project and the WHO Review of Evidence of Health Aspects of Air Pollution¹⁵ (REVIHAAP) and Health Risks of Air Pollution in Europe¹⁶ (HRAPIE) projects. A report from the meeting is being developed and will be used as the starting point for a WHO publication for health risk assessment practitioners and policymakers on general principles for air pollution health risk assessment for various purposes and at various scales. The concept for the meeting grew out of discussions that originated at the thirty-second session of the Working Group on Effects (Geneva, 12–13 September 2013).

8. Also under Theme 4 of the Task Force workplan, and growing out of the discussions at the thirty-second session of the Working Group on Effects, the Task Force worked with

¹¹ See <http://iek8wikis.iek.fz-juelich.de/HTAPWiki/WP2.2>.

¹² See http://www.htap.org/meetings/2013/2013_12/Agenda.html.

¹³ See <http://www.gmos.eu/>.

¹⁴ See <http://aerocom.met.no/Welcome.html>.

¹⁵ See <http://www.euro.who.int/en/health-topics/environment-and-health/air-quality/activities/health-aspects-of-air-pollution-and-review-of-eu-policies-the-revihaap-and-hrapie-projects>.

¹⁶ Ibid.

the International Cooperative Programme (ICP) on Effects of Air Pollution on Natural Vegetation and Crops (ICP Vegetation) to organize a session within the International Conference on Ozone and Plants (Beijing, 18–21 May 2014). The Conference was organized by the State Key Laboratory of Urban and Regional Ecology of the Research Centre for Eco-Environmental Sciences at the Chinese Academy of Sciences, the International Union of Forest Research Organizations¹⁷ (IUFRO) and ICP Vegetation. The session focused on whether methods developed for vegetation impact assessment in Europe and North America are applicable also to Asia. Overall the emerging evidence from Asia reveals that ozone damage to crops and natural vegetation is at least comparable to that in Europe, and in many cases even higher for ozone-sensitive crops. One of the outcomes relevant for the Task Force was that flux-based approaches show ozone damage occurring at lower threshold values than the commonly used European accumulated ozone exposure over a threshold of 40 parts per billion (AOT40) or American W126¹⁸ methodologies. While regional emission abatements will have to deal with peak ozone episodes, global cooperation on methane emission reductions will be beneficial to lower global background ozone and damage to plants.

9. Following the ozone and plants conference described above, the Task Force organized a joint workshop with the Model Inter-Comparison Study for Asia Phase III (Beijing, 22–23 May 2014). The workshop was organized for the leaders of the Task Force, MICS-Asia Phase III and AQMEII to discuss the plans for a series of global-regional coupled emission perturbation sensitivity experiments, with emissions and model set-up harmonized across the globe. The workshop was hosted by the State Key Laboratory of Atmospheric Boundary Layer Physics and Atmospheric Chemistry of the Institute for Atmospheric Physics at the Chinese Academy of Sciences, and focused on presenting progress in the work under MICS-Asia, AQMEII, and the Task Force. Task Force, AeroCom and AQMEII experts also presented a number of possible methodologies for analysing model experiments and explained and advocated for standardized output protocols in view of global interoperability of data. The MICS-Asia, AQMEII, and Task Force participants agreed to continue the overall coordination through periodic web conferences and to set up a small coordination group focused on data interoperability.

10. Scientific publications resulting from the collaborative work of the Task Force in 2014 include:

- (a) “A global assessment of precipitation chemistry and deposition of sulfur, nitrogen, sea salt, base cations, organic acids, acidity and pH, and phosphorus”;¹⁹
- (b) “Impacts of intercontinental transport of anthropogenic fine particulate matter on human mortality”.²⁰

II. Activities during the remainder of 2014

11. During the remainder of 2014, the Task Force’s activities will focus on completing work under Themes 1 and 2 of its workplan, including:

- (a) Publishing of the reviewed report documenting the HTAPv2.2 emissions mosaic for 2008 and 2010 (work package 1.1);

¹⁷ See <http://www.iufro.org/>.

¹⁸ See http://www.epa.gov/ttn/naaqs/standards/ozone/data/2007_01_environmental_tsd.pdf

¹⁹ Robert Vet and others, *Atmospheric Environment*, vol. 93 (August 2014), pp. 3–100.

²⁰ Susan C. Anenberg and others, *Air Quality, Atmosphere and Health* (March 2014).

(b) Release of the benchmark 2010–2050 emission scenarios for analysis of the policy response to intercontinental transport (work package 1.2) developed by the Centre for Integrated Assessment Modelling;

(c) Completion of regional and global modelling experiments for 2008 and 2010 by the end of the calendar year (work package 2.4).

12. Working with the Task Force on Integrated Assessment Modelling and the Centre for Integrated Assessment Modelling, the Task Force is planning a workshop on 14 and 15 October 2014 to discuss global emissions scenarios. The workshop will include discussion of the benchmark scenarios for 2010–2050 developed by the Centre for Integrated Assessment Modelling in conjunction with several European Union-funded projects. The benchmark scenarios define a current legislative scenario, a no-further-control scenario and a maximum technically feasible scenario. The workshop will discuss methodologies for evaluating the economic costs and the institutional and social feasibility of the various control measures that comprise the wedges of emission reduction that lie between these benchmark scenarios.

13. Working with the AQMEII regional model intercomparison project, the Task Force will help to organize a one-day workshop to discuss coupled regional and global modelling experiments for the North American and European domains. This meeting will take place on 30 October 2014 at the US EPA office in Research Triangle Park, North Carolina, directly after the thirteenth annual Community Modelling and Analysis System meeting from 27 to 29 October. This workshop will serve to close out AQMEII Phase 2 and officially launch AQMEII Phase 3, in which regional models will perform perturbation experiments coordinated with the HTAP2 experiments and global and regional scales approaches will be evaluated.

III. Activities in 2015

14. The Task Force expects to hold an annual meeting in the second quarter of 2015, although a date and location have not yet been set.

15. In the first half of 2015, results from the ensemble of global and regional modelling experiments for 2008 and 2010 (Theme 2) are expected to be available. Cooperative work will focus on updating the intercontinental source-receptor parameterizations (Theme 2), evaluating the model simulations using various types of observations (Theme 3), evaluating alternative control scenarios (Theme 1) and initiating assessments of the impacts of future control strategies (Theme 4).

16. By the end of 2015, the co-Chairs expect to produce a short report summarizing policy-relevant messages emerging from the analysis regarding the importance of intercontinental transport and the availability of mitigation measures.

17. The Task Force co-Chairs also expect to contribute to the Convention's assessment of past progress and future challenges.
