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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**

Working Group on Effects

First joint session*

Geneva, 14–18 September 2015

Item 10 (a) of the provisional agenda

**Outreach efforts, information sharing and cooperation with other
organizations and programmes: hemispheric transport of 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

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- * The Executive Body to the Convention agreed that, as of 2015, the Working Group on Effects and the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe should meet jointly, to achieve enhanced integration and cooperation between the Convention's two scientific subsidiary bodies (ECE/EB.AIR/122, para. 47 (b)).
 - ** The present document is being issued without formal editing.

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 2016.

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. To encourage and organize the publication of scientific products from the workplan, the Task Force has launched a special issue of the journal *Atmospheric Chemistry and Physics*, entitled "Global and regional assessment of intercontinental transport of air pollution: results from HTAP, AQMEII and MICS."² The special issue is open for submissions until 1 December 2016, but submitted articles will be reviewed and published electronically as received. The special issue is open to all publications related to the intercontinental transport of air pollution and addressing the policy-relevant science questions identified by the Task Force:

(a) What fraction of air pollution can be attributed to contemporary anthropogenic regional emissions sources versus extra-regional, non-anthropogenic, or legacy sources of pollution?;

(b) What is the contribution of each fraction to impacts on human health, ecosystems and climate change?;

(c) How sensitive are regional pollution levels and related impacts to changes in regional versus extra-regional emission sources?;

(d) How will the contributions of the fractions and their sensitivities change in the future as a result of expected air pollution abatement efforts or climate change?;

(e) How do the availability, costs and impacts of additional emission abatement options compare across different regions?

3. The Task Force co-chairs are considering organizing a second special issue or a review article for publication in a multidisciplinary journal, such as *Elementa: Science of the Anthropocene*, which would encompass the scope of the Task Force workplan from emissions and future scenarios, through atmospheric fate and transport, to impacts on health, ecosystems, and climate.

4. The first article (under theme 1) submitted to the *Atmospheric Chemistry and Physics* special issue documents the development of the 2008 and 2010 global emissions mosaics compiled by a team led by the European Union's Joint Research Centre with

¹ See <http://www.htap.org>.

² http://www.atmos-chem-phys-discuss.net/special_issue257.html.

contributions from Canada, China, Japan, the Netherlands, the Republic of Korea and the United States of America.³

5. Under Theme 1 (Emissions and Projections) of the Task Force workplan, the Task Force on Hemispheric Transport of Air Pollution, jointly with the Task Force on Integrated Assessment Modelling (TFIAM), organized a Second Workshop on Global Emissions Scenarios to 2050, held at the International Institute for Applied Systems Analysis (IIASA) in Austria on 11–13 February 2015. The workshop participants reviewed a set of global emissions scenarios out to 2050 based on explicit assumptions about air pollution control technologies that was developed by the Center for Integrated Assessment Modelling (CIAM) with funding from the European Evaluating the CLimate and Air Quality ImPacts of Short-livEd Pollutants (ECLIPSE) project.⁴ The participants concluded that the scenarios provide an acceptable envelope of possible futures and can be used to estimate the benefits of continuing to implement current air pollution control policies, the benefits of maximum implementation of further end-of-pipe control, the benefits from a climate change mitigation policy, and the benefits of a partial closing of the gap between current policies and maximum control. The objectives, presentations, and conclusions of this workshop are summarized in a separate document.

6. Under Theme 2 (Source-Receptor Modelling) of the Task Force workplan, approximately 20 global modelling groups and 15 regional modelling groups are participating in coordinated experiments evaluating the impacts of emission reductions on ozone and fine particle concentrations and their source-receptor relationships. At the regional scale, the Task Force is cooperating with the Air Quality Model Evaluation International Initiative (AQMEII) Phase III, covering European and North American domains, and the Model Intercomparison Study – Asia (MICS-Asia) Phase III, covering an East Asian domain. At the global scale, model results are being collected on the AeroCom server at the Meteorological Synthesizing Centre-West (MSC-West). MSC-West has provided a web-based interface for quick visualization of the submitted results which is available online.⁵

7. Under Theme 3 (Model Evaluation) of its workplan, the Task Force held a workshop to discuss the initial results of the coordinated modelling experiments and comparisons to observations. This workshop was held in conjunction with the 4th Western Air Quality Modelling Conference in Boulder, Colorado, on 11–15 May 2015. The combined meeting was hosted by the National Center for Atmospheric Research with support from the Western States Air Resources Council and the U.S. Environmental Protection Agency. The first two and half days of the combined meeting focused on the work of the Task Force and the ability of current global and regional models to simulate intercontinental transport of air pollution, including the impacts of ozone and fine particle transport into western North America. In the second two and half days, the discussion extended to other challenges facing air quality management in this region, including fires, regional haze, emissions from oil and gas activities and wintertime ozone. Approximately 165 experts participated in the

³ G. Janssens-Maenhout et al. (2015) HTAP_v2: a mosaic of regional and global emission gridmaps for 2008 and 2010 to study hemispheric transport of air pollution. <http://www.atmos-chem-phys-discuss.net/15/12867/2015/>

⁴ See <http://eclipse.nilu.no/>.

⁵ See [http://aerocom.met.no/cgi-bin/aerocom/surfobs_annualrs.pl?Project="HTAP2"](http://aerocom.met.no/cgi-bin/aerocom/surfobs_annualrs.pl?Project=).

week of meetings, 114 in person and 51 via web conferencing. The presentations from the meeting are available online.⁶

8. Under Theme 4 (Impact Assessment) of the Task Force workplan, representatives of the Task Forces on Hemispheric Transport, Integrated Assessment Modelling, and Reactive Nitrogen and the International Cooperative Programme on Effects of Air Pollution on Natural Vegetation and Crops (ICP Vegetation) participated in a symposium entitled "Sustainable Food Production and Air Pollution: Reducing emissions generates many benefits." The event was hosted by the European Joint Research Centre on 10 July 2015 in Milan in conjunction with the World Expo 2015.

9. Participants in the Task Force have contributed to the Convention's 2016 assessment report focusing on Key Message 4 regarding trends in tropospheric ozone and its impacts.

10. The collaborative work of the Task Force in 2015 resulted in an additional scientific publication.⁷

II. Activities during the remainder of 2015

11. During the remainder of 2015, the Task Force expects to:

(a) Hold several web conferences to check progress of model simulations and evaluations under Themes 2 and 3 of its workplan;

(b) Release further documentation and data for the benchmark 2010–2050 emission scenarios for analysis of the policy response to intercontinental transport (work package 1.2) developed by CIAM;

(c) Contribute to the 2016 Assessment Report.

III. Activities in 2016-2017

12. In the 2016-2017 period, the work of the Task Force will shift from the preparation and execution of coordinated modelling experiments (Themes 1, 2, and 6) to analysis of the results and their implications for future emissions control strategies (Themes 3, 4, and 5). The Task Force will focus on producing:

(a) Peer reviewed articles addressing the full scope of the Task Force workplan for publication in a special issue of *Atmospheric Chemistry and Physics*, and if appropriate, an additional special issue or review article in a multidisciplinary journal, as described above;

(b) An interactive tool, possibly in the form of a spreadsheet that will allow individuals to explore future global emissions scenarios and their associated impacts.

13. The Task Force will hold a workshop in the first quarter of 2016 focused on the integrated analysis of source-receptor relationships from the 2008–2010 global and regional

⁶ See www.htap.org.

⁷ Chakraborty, T., G. Beig, F.J. Dentener, O. Wild (2015). Atmospheric transport of ozone between Southern and Eastern Asia, *Science of the Total Environment*, 523:28–39, <http://dx.doi.org/10.1016/j.scitotenv.2015.03.066>.

modelling experiments, the 2010–2050 emissions scenarios, and the assessment of impacts on health, ecosystems, and climate.

14. The Task Force will pursue opportunities to organize additional workshops and meetings together with organizational partners inside and outside the Convention. Some topics of interest to both the Task Force and potential partners include global and regional model evaluation; health, ecosystem, and climate impact assessments; scenario evaluation and mitigation options; impacts of climate change on air pollution; global transport of mercury and persistent organic pollutants; impacts of intercontinental transport in South and East Asia; ozone trend analysis and its implications; air quality data infrastructure and interoperability.
