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## 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**

**Working Group on Effects**

**Second joint session\***

Geneva, 13–16 September 2016

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 2016-2017 workplan for implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/133/Add.1, items 1.1.3.2, 1.1.4.1–1.1.4.4 and 1.3.1) and in the informal document submitted to the Executive Body for the Convention at its thirty-fourth

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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)).



session, “basic and multi-year activities in the 2016–2017 period” (items 1.5.2, 1.5.3, 1.6.1 and 1.6.2). 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 workplan, the Task Force is requested to present an annual report on its work to the EMEP Steering Body. The present report details the progress made by the Task Force since its previous report and provides an overview of upcoming activities through 2017.

## 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 implement its 2012–2016 workplan, which is outlined on the Task Force website.<sup>1</sup> 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 open-access journal *Atmospheric Chemistry and Physics*, entitled “Global and regional assessment of intercontinental transport of air pollution: results from HTAP,<sup>2</sup> AQMEII<sup>3</sup> and MICS<sup>4</sup>”.<sup>5</sup> The special issue is open for submissions until 1 December 2016, but any articles submitted will be reviewed and published electronically as received. The special issue is open to all papers related to the intercontinental transport of air pollution and addressing the following 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 extraregional, 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 extraregional 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. As of early June 2016, one article has been published in the special issue and five more are undergoing review through *Atmospheric Chemistry and Physics* discussions.<sup>6</sup> During the remainder of 2016, 10 to 15 more submissions are foreseen.

4. Under theme 1 (emissions and projections), the development of a 2008–2010 global emissions mosaic and 2010–2050 emissions scenarios were reported in the Task Force’s 2015 report. No additional work has been completed under this theme in 2016.

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<sup>1</sup> See <http://www.htap.org>.

<sup>2</sup> I.e. the Task Force on “Hemispheric Transport of Air Pollution” (HTAP).

<sup>3</sup> Air Quality Model Evaluation International Initiative.

<sup>4</sup> Model Intercomparison Study-Asia.

<sup>5</sup> See [http://www.atmos-chem-phys-discuss.net/special\\_issue257.html](http://www.atmos-chem-phys-discuss.net/special_issue257.html).

<sup>6</sup> See [http://www.atmos-chem-phys-discuss.net/discussion\\_papers.html](http://www.atmos-chem-phys-discuss.net/discussion_papers.html).

5. Under theme 2 (source-receptor modelling), 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 Model Intercomparison Study-Asia (MICS) 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. The Centre has provided a web-based interface for quick visualization of the results submitted that is available online.<sup>7</sup> The Task Force has held several web conferences to discuss model results and analyses. As of early June 2016, new model results were still being delivered.

6. Under theme 3 (model evaluation), work has started on two major issues: (a) evaluation of global and regional models under North American inflow conditions (ongoing); and (b) evaluation of global and regional models at North American and European air quality stations.

7. Under theme 4 (impact assessment), the Task Force organized a workshop at the Institute for Advanced Sustainability Studies in Potsdam, Germany, from 17 to 19 February 2016. Approximately 55 experts attended the workshop and 13 participated via web conferencing. The first day of the workshop was organized jointly with the Arctic Monitoring and Assessment Programme under the Arctic Council, following an informal request for collaboration between EMEP and that body. The Task Force and the participants from the Arctic Monitoring and Assessment Programme identified areas of mutual interest and opportunities for enhanced cooperation with respect to Arctic air pollution, including the evaluation of future scenarios and mitigation strategies for mercury, persistent organic pollutants and short-lived climate pollutants (including black carbon and methane). The second and third days of the workshop were dedicated to evaluating methodologies to better quantify impacts of air pollution on human health, ecosystems (including crops) and climate. Presentations were given by representatives of a variety of relevant expert communities or collaborative efforts, including on: climate modelling under the Chemistry-Climate Modelling Initiative; health impact assessment under the Global Burden of Disease Project and the World Health Organization; and global integrated assessment modelling under the Inter-Sectoral Impact Model Intercomparison Project.<sup>8</sup> The exchange of information focused on the possibilities for harmonizing methods and leveraging results in a variety of assessment activities foreseen in the coming years. Presentations from the meeting are available online.<sup>9</sup>

8. Participants in the Task Force have contributed to chapter 4 of the Convention's 2016 assessment report<sup>10</sup> regarding trends in tropospheric ozone and its impacts, as well as to chapter 8 regarding the global reach of air pollution.

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<sup>7</sup> See [http://aerocom.met.no/cgi-bin/aerocom/surfobs\\_annualrs.pl?Project="HTAP2"](http://aerocom.met.no/cgi-bin/aerocom/surfobs_annualrs.pl?Project=).

<sup>8</sup> See <https://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/research/rd2-cross-cutting-activities/isi-mip>.

<sup>9</sup> See <http://www.htap.org>.

<sup>10</sup> Rob Maas and Peringe Grennfelt, eds., *Towards Cleaner Air: Scientific Assessment Report 2016* (Oslo, 2016). Available from <http://www.unece.org/environmental-policy/conventions/envlrtapwelcome/publications.html>.

## II. Activities during the remainder of 2016

9. During the remainder of 2016, the Task Force expects to:
- (a) Hold several web conferences to check progress in analyses and evaluations under themes 2 and 3 of its workplan and contributions to the special issue of *Atmospheric Chemistry and Physics* mentioned above;
  - (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 the EMEP Centre for Integrated Assessment Modelling;
  - (c) Organize a side event addressing issues regarding the inclusion of ozone in crop modelling at the sixth Agricultural Model Intercomparison and Improvement Project (AgMIP) global workshop (Montpellier, France, June 2016);
  - (d) Organize side events at the Quadrennial Ozone Symposium meeting in Edinburgh, Scotland, and the International Global Atmospheric Chemistry Project 2016 Science Conference, in Breckenridge, Colorado (United States of America), both in September 2016.

## III. Activities in 2017–2018

10. In the 2017–2018 period, the work of the Task Force will focus on the analysis of the ensemble of completed model experiments and their implications for future emissions control strategies (themes 3, 4, and 5). More specifically, the Task Force will develop:

- (a) An overview of the analysis completed since the Task Force's 2010 assessment report and a synthesis of the policy-relevant insights from the individual analyses submitted to the special issue of *Atmospheric Chemistry and Physics*;
- (b) An interactive tool, possibly in the form of a spreadsheet, that will allow individuals to use the Hemispheric Transport of Air Pollution 2 (HTAP2) modelling results to explore future global emissions scenarios and their associated impacts;
- (c) A review of the science questions to be addressed based on the results of the Task Force to date, to improve its ability to quantify the impacts of the intercontinental transport of air pollution.

11. 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; and air quality data infrastructure and interoperability. Discussions will be initialized to explore opportunities to produce harmonized emission inventories that will be the baseline for work to be performed for the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2019–2020).