

**Economic and Social Council**

Distr.: General
31 August 2017

English only

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

Third joint session

Geneva, 11-15 September 2017

Item 3 of the provisional agenda

**Progress in activities in 2017 and further development
of effects-oriented activities**

Modelling and mapping

**Report by the Coordination Centre for Effects and the Task Force on
Modelling and Mapping**

Summary

The present report is being submitted for consideration by the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe and the Working Group on Effects at their third joint session in accordance with the request of the Executive Body for the Convention on Long-range Transboundary Air Pollution in the 2016-2017 workplan for the implementation of the Convention (ECE/EB.AIR/133/Add.2, items 1.1.1.15, 1.1.1.16, 1.1.3.3, 1.1.4.2 and 1.3.1), the informal document approved by the Executive Body for the Convention at its thirty-fourth session, “Basic and multi-year activities in the 2016-2017 period” (items 1.1.1-1.1.3, 1.1.5-1.1.7, 1.2.1, 1.2.2, 1.5.1 and 1.8.1-1.8.3) and the Long-term Strategy for the Convention (ECE/EB.AIR/106/Add.1, decision 2010/18, annex).

The present report includes a review of the implementation of the workplan activities to be undertaken by the International Cooperative Programme on Modelling and Mapping of Critical Levels and Loads and Air Pollution Effects, Risks and Trends (ICP

GE.17-15217(E)



* 1 7 1 5 2 1 7 *

Please recycle



Modelling and Mapping) and a summary of the discussion and conclusions reached at the thirty-third meeting of the ICP Modelling and Mapping Task Force (Wallingford, United Kingdom of Great Britain and Northern Ireland, 4-6 April 2017). The meeting focused on the results of the call for data for updating eutrophication and acidification critical loads and for calculating critical loads for biodiversity. The meeting also addressed the update of the chapter 3 and the section on nitrogen immobilization of the *Manual on Methodologies and Criteria for Modelling and Mapping Critical Loads and Levels and Air Pollution Effects, Risks and Trends*.¹ The last main discussion point was the update of the mandate of ICP Modelling and Mapping.

The meeting was organized in the context of the shutdown of the Coordination Centre for Effects and therefore in a context of high uncertainty for the future activities of the modelling and mapping community.

Contents

	<i>Page</i>
I. Introduction	3
II. Progress in the modelling and mapping activities	3
III. Relevant workplan items	4
A. Monitoring and modelling tools (workplan item 1.1.1)	4
B. Call for data on biodiversity critical loads (workplan item 1.1.1.15)	5
C. Update of the Modelling and Mapping Manual (workplan item 1.1.1.16)	6
D. Investigate synergies and trade-offs between air pollution, climate and nature policies (workplan item 1.1.3.3)	6
E. Improving the functioning of the scientific bodies (workplan item 1.4)	7
F. Assess implications of air pollution mitigation strategies in the Northern Hemisphere for health, ecosystem and climate impacts (workplan item 1.1.4.2) and explore possible uses of scientific tools, data and infrastructure to support Arctic Monitoring and Assessment Programme activities (workplan item 1.3.1)	7
IV. Recommendations and other outcomes of the thirty-third meeting of the Task Force	7

¹ Online document, available from http://icpmapping.org/Latest_update_Mapping_Manual.

I. Introduction

1. The International Cooperative Programme on Modelling and Mapping of Critical Levels and Loads and Air Pollution Effects, Risks and Trends (ICP Modelling and Mapping) is a scientific programme of the Working Group on Effects under the United Nations Economic Commission for Europe (ECE) Convention on Long-range Transboundary Air Pollution.² France is the lead country of the Task Force of ICP Modelling and Mapping. The Netherlands is the lead country of the ICP Modelling and Mapping programme centre — the Coordination Centre for Effects (CCE).³ The Task Force is hosted by the French National Competence Centre for Industrial Safety and Environmental Protection (INERIS). CCE is hosted at the Dutch National Institute for Public Health and the Environment (RIVM). The Dutch Government has decided to stop funding CCE, which has been led by the Netherlands since the Executive Body welcomed the offer of the Netherlands to host CCE activities in 1989 (ECE/EB.AIR/20, para. 38 (f)).

2. Representatives of more than 30 Parties to the Convention participate in the activities of ICP Modelling and Mapping. National focal centres of ICP Modelling and Mapping contribute to methods and data to help compile and maintain the database of critical loads for acidification and eutrophication. National focal centres research novel thresholds for impacts on plant species diversity. ICP Modelling and Mapping results are also used in the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) Task Force on Integrated Assessment Modelling in collaboration with the Meteorological Synthesizing Centre-West, the Meteorological Synthesizing Centre-East and the Centre for Integrated Assessment Modelling. ICP Modelling and Mapping collaborates with all the international cooperative programmes under the Convention and with the Joint Task Force on the Health Aspects of Air Pollution.⁴

II. Progress in the modelling and mapping activities

3. CCE results reported herein would not have been possible without additional funding. The Dutch National Institute for Public Health and the Environment gratefully acknowledges additional funds provided by France, Germany, Norway, Sweden, Switzerland and the Nordic Council of Ministers, in support of final CCE tasks to be performed in 2017, as noted by the Executive Body for the Convention at its thirty-sixth session in December 2016 (ECE/EB.AIR/137, para. 52).

4. The thirty-third meeting of the ICP Modelling and Mapping Task Force was hosted by the Centre for Ecology and Hydrology (Wallingford, United Kingdom of Great Britain and Northern Ireland, 4-6 April 2017).

5. Fifty seven delegates from the following 22 countries participated in the meeting: Austria, Canada, China, Croatia, Czechia, Denmark, France, Germany, Iceland, Italy, Latvia, Lithuania, Netherlands, Norway, Poland, Russian Federation, Serbia, Spain, Sweden, Switzerland, United Kingdom and United States of America. Representatives of the Bureau of the Working Group on Effects, CCE, the International Cooperative

² See www.icpmapping.org.

³ See www.wge-cce.org.

⁴ The Task Force is a joint body of the World Health Organization (WHO) European Centre for Environment and Health and the Executive Body for the Convention.

Programme on Assessment and Monitoring of Air Pollution Effects on Forests, the International Cooperative Programme on Effects of Air Pollution on Natural Vegetation and Crops (ICP Vegetation), the International Cooperative Programme on Assessment and Monitoring of the Effects of Air Pollution on Rivers and Lakes, the Joint Expert Group on Dynamic Modelling and the World Meteorological Organization also attended. In 2017, lack of funding from the lead countries and from workplan-related funds prevented a number of representatives of countries in Eastern Europe, the Caucasus and Central Asia from attending the meeting.

6. Decisions by the ICP Modelling and Mapping Task Force were reviewed by the participants during the meeting. Presentations and posters were made available on the ICP Modelling and Mapping website. Rosemary Hails, Director of Biodiversity and Ecosystem Science at the Centre for Ecology and Hydrology and Ian Boyd, chief scientific adviser at the Department for Environment Food and Rural Affairs, welcomed the participants to the meeting and David Fowler provided a keynote lecture.

7. The objectives of the meeting included:

(a) Sharing new knowledge on air pollution effects on biodiversity established through (field) experiments and modelling;

(b) Presentation of results: the implementation in the European critical loads database and the response of national focal centres to the call for data 2015-2017;

(c) An update of the *Manual on Methodologies and Criteria for Modelling and Mapping Critical Loads and Levels and Air Pollution Effects, Risks and Trends* (Modelling and Mapping Manual);⁵

(d) Finalization of the ICP Modelling and Mapping mandate;

(e) Consideration of the ICP Modelling and Mapping-relevant items of the 2016-2017 workplan for the implementation of the Convention (ECE/EB.AIR/133/Add.2), the Long-term Strategy for the Convention (ECE/EB.AIR/106/Add.1, decision 2010/18, annex) and the the Action Plan for the Implementation of the Long-term Strategy for the Convention (ECE/EB.AIR.109/Add.1, decision 2011/14, annex);

(f) Consideration of other Task Force issues, including requirements for reporting to the EMEP Steering Body and the Working Group on Effects at their third joint session.

III. Relevant workplan items

A. Monitoring and modelling tools (workplan item 1.1.1)

8. The Head of CCE informed meeting participants that the shutdown of the Centre had been confirmed for the end of 2017. The activity of CCE could be pursued until that date thanks to additional funds provided by France, Germany, Norway, Sweden, Switzerland

⁵ A first version of the Mapping Manual was published in 1993. It has since been updated three times: in 1996, 2004 and again in 2016. The full text of the 2016 version is available as online, by chapter, from the website of the International Cooperative Programme on Modelling and Mapping of Critical Levels and Loads and Air Pollution Effects, Risks and Trends: http://icpmapping.org/Latest_update_Mapping_Manual.

and the Nordic Council of Ministers. The Dutch National Institute for Public Health and the Environment was committed to ensuring the transfer of the CCE database, while maintaining the integrity and quality of its data, to the institute that would take over the ICP Modelling and Mapping programme centre. It was equally committed to making sure that the 2017 European critical loads database for use in integrated assessment modelling was transferred to the Centre for Integrated Assessment Modelling. The Task Force expressed its thanks to CCE for its long-standing support, advice and leadership. The Task Force also expressed certain misgivings, as its activities were going to be limited without the contribution of the Centre.

9. The Task Force further expressed its concern about the financial situation of several national focal centres and also in relation to the shutdown of CCE. The realization of the workplan items had been limited by the lack of funding for the Centre, as discussed at the thirty-sixth session of the Executive Body in December 2016.

B. Call for data on biodiversity critical loads (workplan item 1.1.1.15)

10. Results of the 2015-2017 call for data were reviewed at the thirty-third meeting of the Task Force on Modelling and Mapping. At that meeting, 13 Parties responded to the call and updated their acidification and eutrophication critical loads. Following that review, Parties were given more time to submit revisions until 22 May 2017. Ultimately, 14 Parties (European Union member States only) submitted critical loads data for acidification and eutrophication, including 7 Parties (France, Germany, Ireland, Italy, Netherlands, United Kingdom and Switzerland) that submitted critical loads data of biodiversity.

11. The critical loads for acidification and eutrophication have been updated in the European critical load database. The Task Force recommended that the critical load database could be used for integrated assessment, and therefore for policy support.

12. The number of sites used - in response to the call - varied greatly: between 5 (Italy) and 1.2 million (Germany). CCE compiled a database of critical loads of biodiversity for the whole ECE region by collaborating with Wageningen Environmental Research (Alterra) institute to compute these critical loads for countries that did not submit data.

13. However, the Task Force recommended that the European database of critical loads of biodiversity be used for scientific purposes only. It recommended that the biodiversity critical load methodology and associated thresholds should continue to be subject to scientific research in general, and, as much as possible, by an increasing number of national focal centres, before considering their use for policy support.

14. CCE had prepared maps with the software in order to prepare and potentially facilitate the transfer of the database and its use to a new ICP Modelling and Mapping programme centre. CCE insisted that the standard of submitted data should be kept high, and that it was important that the source of data should remain transparent. Therefore, it was considered vital that national focal centres continued their work to provide effects-oriented policy support under the Convention, to the European Union and on a national scale.

15. The ICP Modelling and Mapping Task Force recommended that the Working Group on Effects issue a call at its third joint session with the EMEP Steering Body for national focal centre reports to be submitted to the Task Force's thirty-fourth meeting (2018) and to the fourth joint session of EMEP Steering Body and the Working Group on Effects (September 2018). The call would be the continuation of the 2015-2017 call for data on biodiversity critical loads. The call would help support the ICP Modelling and Mapping

community (national focal centres) to continue the development of biodiversity-critical loads including:

- (a) The compilation of the national biodiversity critical load database and — short of the continued existence of CCE at the Dutch National Institute for Public Health and the Environment — national focal centres to optionally seek collaboration with Alterra;⁶
- (b) The continued use of the CCE template and recommendations of the 2015-2017 call for data;
- (c) Ensuring the consolidation of national data by the national focal centres until submission can be orchestrated to a new ICP Modelling and Mapping programme centre;
- (d) The development of the links and coordination with the biodiversity community, at the international, national and local levels.

C. Update of the Modelling and Mapping Manual (workplan item 1.1.1.16)

16. A workshop was co-organized by Switzerland and Germany (Olten, Switzerland, 23-24 February 2017) to discuss long term nitrogen immobilization, a standing issue after the Modelling and Mapping Manual update in 2016. Discussion led to a consensus and a new text has been integrated into a draft version of chapter 5 of the Modelling and Mapping Manual, pending approval by the Working Group on Effects..

17. The Task Force took note of the revision of chapter 3 of the Modelling and Mapping Manual presented by ICP Vegetation. The chapter had been shortened and focused on the methodology, while information likely to be modified frequently had been shifted into annexes. No changes had been made to concentration-based ozone critical levels.

18. The Modelling and Mapping Manual had been sent to the Institute of Global Climate and Ecology (Moscow), which has offered to translate it into Russian. The translation is in progress.

D. Investigate synergies and trade-offs between air pollution, climate and nature policies (workplan item 1.1.3.3)

19. Using submitted critical loads and the background database, a tentative analysis of areas at risk following a reference scenario of the European Union National Emission Ceiling Directive⁷ was conducted and presented at the Task Force on Modelling and Mapping meeting.

20. CCE carried out a tentative analysis of critical load variability under climate change, e.g., under a temperature increase of 3°C following the “Representative Concentration Pathways (RCPs) 4.5 and 6 of the Intergovernmental Panel on Climate Change. These pathways are aimed at stabilizing radiative forcing after 2100, while sulphur dioxide and nitrogen oxides emissions showed a downward trend between 2000 and 2100. Hence, this

⁶ Wageningen, the Netherlands; Dr. Gert jan Reinds, Gertjan.Reinds@wur.nl.

⁷ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, 2016 O.J. (L 344), pp. 1–31.

choice of pathways is likely to be compatible with atmospheric emission reduction scenarios considered in support of the amended multi-pollutant multi-effect Protocol to Abate Acidification, Eutrophication and Ground-level Ozone under the Convention. If successful, results are planned to be reported in the CCE final report 2017.

E. Improving the functioning of the scientific bodies (workplan item 1.4)

21. CCE participated in the forty-sixth meeting of the Task Force on Integrated Assessment Modelling (Paris, 2-3 May 2017), and presented results of the call for data 2015-2017 to be proposed as an update for use in integrated assessment modelling.

22. CCE collaborates with the international cooperative programmes in the development of a common portal for effects-oriented activities. The Task Force of ICP Modelling and Mapping recommends a review of options to relate to the functionalities of the “Critical Load (CL)-Mapper”, under the auspices of the Critical Loads of Atmospheric Deposition Science Committee under the United States National Atmospheric Deposition Program, presented at the thirty-third Task Force meeting. A current version of the CL-Mapper has successfully been implemented to allow users to view the geographical distribution of specified critical loads and their exceedances in certain natural regions of the United States.

F. Assess implications of air pollution mitigation strategies in the Northern Hemisphere for health, ecosystem and climate impacts (workplan item 1.1.4.2) and explore possible uses of scientific tools, data and infrastructure to support Arctic Monitoring and Assessment Programme activities (workplan item 1.3.1)

23. CCE participated in the discussion at a joint workshop of the Arctic Monitoring and Assessment Programme with the Task Force on Hemispheric Transport of Air Pollution on global air pollution scenarios. At the meeting, CCE presented the work on critical loads (of nitrogen and sulphur) for the Northern Hemisphere.

IV. Recommendations and other outcomes of the thirty-third meeting of the Task Force

24. The updated critical load database for eutrophication and acidification should be adopted by the Working Group on Effects so that these data can be submitted to EMEP (Centre for Integrated Assessment Modelling) for inclusion in the Greenhouse Gas Air Pollution Interactions and Synergies (GAINS) model and for use in integrated assessment modelling for the support of air pollution, nature and climate policies.

25. A new call for reports and data on biodiversity critical loads will be requested from national focal centres by the Working Group on Effects in the workplan as of 2018, pending the identification and operation of the successor of CCE. The Working Group on Effects should call upon Parties to support their national focal centres to report at the thirty-fourth meeting of the Modelling and Mapping Task Force (in April 2018) on biodiversity critical loads, while consolidating data and quantitative results of this work on biodiversity critical loads until they can be submitted to a CCE successor. For this work, national focal centres should:

(a) Seek collaboration with Alterra, as appropriate, in order to evaluate data relative to national habitats that have been included in the background database for biodiversity critical loads;

(b) Continue the preparation and development of national biodiversity critical loads according to instructions presented in the documentation of the 2015-2017 call for data on biodiversity critical loads.

26. The following aspects of the biodiversity critical loads methodologies should be further developed:

(a) Assessment of models by model intercomparison and by comparing models to field data;

(b) Inclusion of more habitats in the PROPs model;

(c) Development of a methodology to choose species for biodiversity critical loads;

(d) Investigation into biodiversity endpoints and the sensitivity of the critical loads to thresholds;

(e) Assessment of abiotic factors and plant characteristics determining species occurrence under climate change;

(f) Explore the further development of critical loads in the framework of nature policies and possible impacts on selected ecosystem services.

27. The development and consolidation of acidification and eutrophication critical loads should be continued.

28. It is recommended that chapters 3 and 5 of the Modelling and Mapping Manual be approved by the Working Group on Effects.

29. The ICP Modelling and Mapping Task Force noted that the CCE final report 2017 is to be published by the end of 2017 or beginning of 2018, with a special focus on the last call for data and the European critical loads database.

30. The Task Force urges the Working Group on Effects to finalize the transfer of CCE, by identifying a new programme centre to support the ICP Modelling and Mapping research and activities so that the ICP Modelling and Mapping is able to fulfil its mandate and role within the Convention.
