



**UNECE**

**wge** Working Group on Effects of the  
Convention on Long-range  
Transboundary Air Pollution

# ICP MODELLING AND MAPPING PROGRESS IN WORKPLAN 2022-2023 & PROPOSALS FOR WORKPLAN 2024-2025

EMEP SB / WGE 9<sup>th</sup> Joint Session (Geneva, 11 – 15 September 2023)

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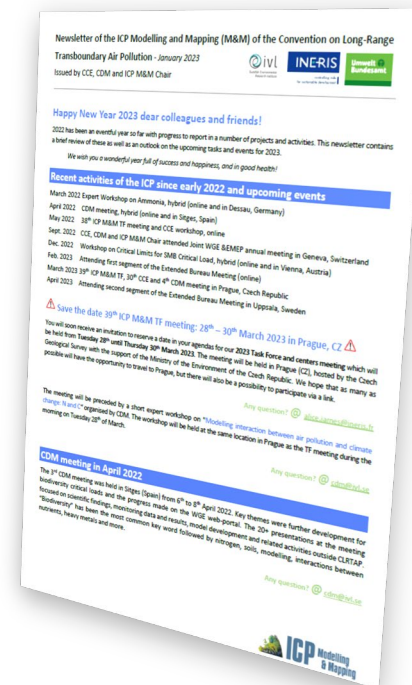
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# ICP M&M Task Force news and ongoing activities

Communication with NFCs and other interested people  
Newsletters

Condensed information to NFCs on main ICP M&M topics

- #1 in July 2019
- #2 in January 2020
- #3 in July 2020
- #4 in January 2021
- #5 in July 2021
- #6 in February 2022
- #7 in January 2023
- #8 in July 2023



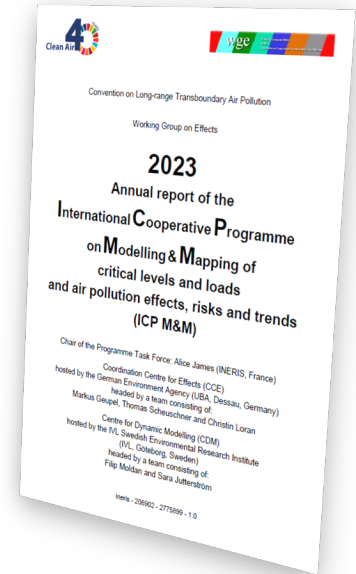
# ICP M&M Task Force news and ongoing activities

39<sup>th</sup> Task Force meeting, 30<sup>th</sup> CCE & 4<sup>th</sup> CDM meeting

Prague, 28 – 30 March 2023



- Hybrid meeting
- 1 afternoon + 2 days
- 51 participants
- 17 Parties to the Convention, 18 countries
- 17 National Focal Points
- Main topics on scientific work linked to Critical Loads
- Main CCE and CDM achievements in this regard -> this presentation



➤ [ICP M&M 2023 Report is available from CCE website – Meeting page](#)

# ICP M&M – Contributions to/with other groups

## ➤ Other ICPs' meetings



- EMEP/WGE Extended Bureaux Meeting, 1<sup>st</sup> segment (Feb. 2023)
- ICP Vegetation TF Meeting (Feb. 2023)
- ICP Waters and Integrated Monitoring TF Meeting (May 2023)
- ICP Forests TF Meeting (June 2023)

## ➤ Collaboration with other groups

- EMEP Status Report 2022:  
[EMEP Status Report 1 2022.pdf](#)
- AQMEII4 (Air Quality Model Evaluation International Initiative)
- ETC Air Pollution, Transport, Noise and Industrial Pollution (ETC/ATNI); Report update:  
[ETC/ATNI Report 04/2020: Costs of air pollution from European industrial facilities 2008–2017. — Eionet Portal \(europa.eu\)](#)



# Ongoing Workplan 2022-2023

WP item	Activity description / objectives	Expected outcome /deliverable	Lead body(ies)	Resource requirements and/or funding sources
#1	Empirical Critical Loads: Review and revision of the CLemp N published in 2011 (continued)	Report on Empirical Critical Loads in Europe (2022)	ICP M&M / CCE	National Focal Centres and recommended contributions
#2	Harmonization of the receptor map for Europe	Harmonized receptor map for Europe (2023)	ICP M&M / CCE	CCE and Germany
#3	Critical Levels of ammonia : literature review and empirical data provision supporting a workshop	Organization of an International Workshop and Workshop report	ICP M&M / CCE	CCE and Germany
#4	Modelling interaction between air pollution and climate change: N and C	Expert workshop (2022)	ICP M&M / CDM	CDM and National Focal Centres experts
#5	Modelling impact of air pollution on biodiversity in 2030 and beyond	Report on methodology development (2023)	ICP M&M / CDM	CDM and National Focal Centres experts
#6	Restructuring the common WGE website ( <a href="http://www.unece-wge.org">www.unece-wge.org</a> )	New version launched 2022, updated 2023	WGE Bureau, CDM	CDM and recommended contributions

# CDM progress on activities

## Expert workshop on Modelling interaction between air pollution and climate change: N and C

- Goal: to model effects of N on ecosystems including biodiversity is an old problem which is, however, not fully resolved and it is further complicated by climate change. Interaction between C and N is crucial but not well-enough captured by the models.
- Took place March 2023 in Prague
- 19 participants plus 3 on-line, experts on modelling, monitoring & ecosystem processes

# CDM progress on activities

## Expert workshop on Modelling interaction between air pollution and climate change: N and C

### Conclusions

- Models are increasingly capable. Data availability is all increasing. At the same time models are increasingly complex and more data demanding. On outstanding issue is modelling of N cycling in ecosystems.
- Modelling biodiversity has several additional challenges when the biogeochemistry is “solved”. Including data availability, definition of targets, confounding factors (CC, LU).
- More efforts to cooperate with CC and BD communities (e.g. connecting C and N reporting, on BD indicators).
- Do we really need more exact answers, when 68% of Europe has CL for N exceeded? More science may not be the only solution. Communication? Else?
- What can DM do for CLRTAP? To describe future effects. Including timing/delays. (Agreement on what needs to be shown is dependent on dialogue between “modellers” and “politicians”.)

# CDM progress on activities

## Report on methodology development and recommendations for CFD 2024/25 (DM part of the CFD)

- Report aims at using modelled biodiversity change to set CL for N

### Timeline

- Autumn 2024                      CFD launched
- March – April 2024            CDM Workshop to define requirements and methodology for the CFD
- February 2024                 Draft report finished as a background material for the CDM workshop



# CDM progress on activities

New version of common WGE portal launched!

- [www.unece-wge.org](http://www.unece-wge.org)
- Draft presented in Uppsala on WGE Extended Bureau meeting in April 2024
- Since the 8<sup>th</sup> EMEP&WGE meeting all ICPs provided an input (Thanks!)
- Now published
- Webpage centered around three themes: **Monitoring, Modelling, Impacts**
- Separate presentation of the web site on Thursday 14<sup>th</sup>



# CDM progress on activities – Saltsjöbaden VII

Following conclusions/actions could be supported with help of DM

## **#7 Strengthen key indicators of damage to terrestrial biodiversity across the UNECE region to set critical loads and levels for nitrogen deposition and ammonia concentrations (EB and Parties)**

Increasing ammonia concentrations in ambient air across Europe, emission reductions of nitrogen oxides, as well as increased pressure on biodiversity motivates further development and disaggregation key indicators to support the Air Convention objectives.

## **#8 Prioritize the protection and maintenance of nature types and areas still in good condition over restoring areas after damage has already occurred (EB and WGE)**

Restoration of damaged ecosystems is not always possible. ‘Rewilding’ does not necessarily lead to the return of biodiversity equivalent to pre-damage levels. Measures to restore damaged ecosystems are often extremely expensive and there can be long time delays between initiation of restoration efforts and observations of positive impacts. Monitoring, modelling and mapping tools are available within the Air Convention to understand which emission sources are especially important for ecosystems at risk, and these sources should be prioritized for mitigation measures.

# CDM progress on activities – Saltsjöbaden VII

Following conclusions/actions could be supported with help of DM

## #9 Increase the number of indicators used to show the impacts of air pollution on vegetation (crops and ecosystems) (EB and WGE)

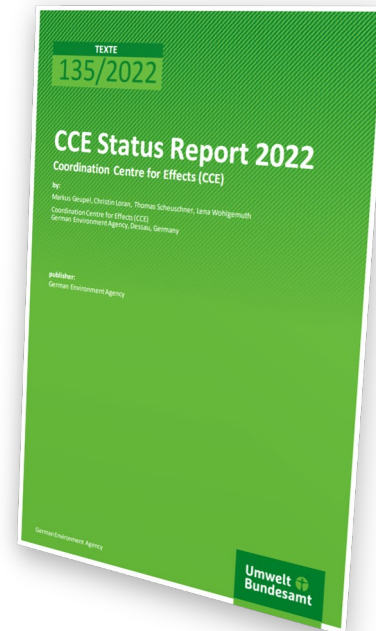
The indicators currently used to describe air pollution effects are not fully in line with knowledge developed in recent scientific developments. Aspects currently lacking, and which need to be represented by appropriate indicators, include the contribution of methane to ozone impacts, the influence of nitrogen and ozone exposure on carbon sequestration in soils and biodiversity, as well as nitrogen use efficiency of agricultural and forest areas.

# CCE Status report 2022

Report published

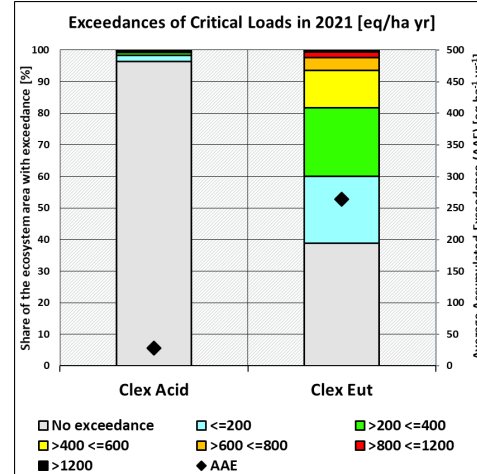
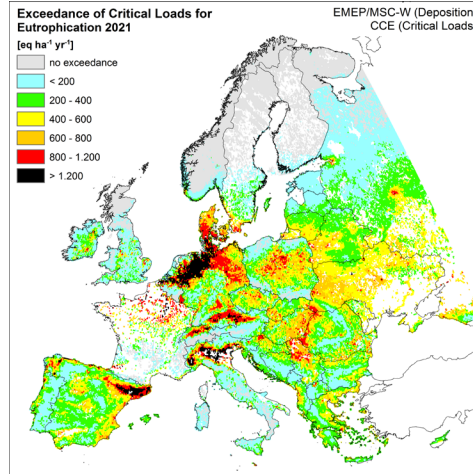
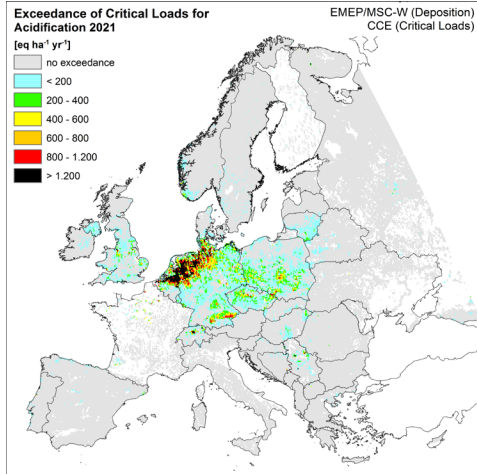
[CCE Status Report 2022 | Umweltbundesamt](#)

- Overview of NFC national CL data
- CCE Background Database
- Summary of ICP M&M contribution to the review of the Gothenburg Protocol
- Critical Atmospheric Inputs for marine ecosystems



# EMEP Status report 2023

## Cooperation with MSC-West and contribution to the report's content

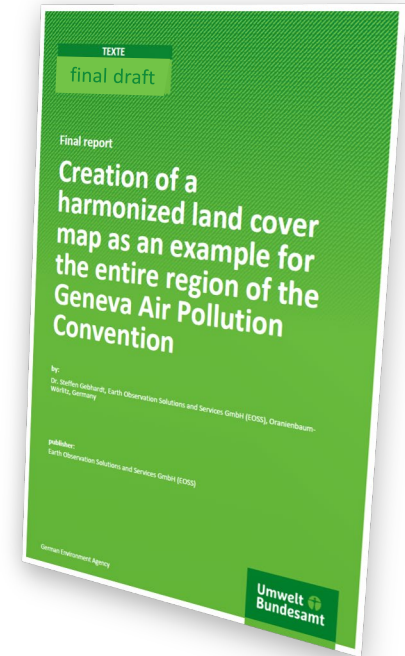


# CCE Ongoing Activities for Workplan 22/23 (1/3)

Harmonization of the Receptor map for Europe – nearly completed

## Completed

- Update important input data for e.g. background database and the EMEP/MSC-W model
- Update of the receptor map is completed and is available upon request [cce@uba.de](mailto:cce@uba.de)





# CCE Ongoing Activities for Workplan 22/23 (2/3)

## Harmonization of the Receptor map for Europe – nearly completed

### CORINE Land Cover 2018

European Environment Agency. 2018. "Corine Land Cover (CLC) 2018, Version 2020\_20u1." European Environment Agency (EEA) under the framework of the Copernicus programme. <https://land.copernicus.eu/pan-european/corine-land-cover/clc2018>.

### EEA Ecosystem Type Map v3.1

European Environment Agency. 2012. "Ecosystem Types of Europe - Version 3.1." European Environment Agency. [https://sdi.eea.europa.eu/catalogue/srv/eng/catalog\\_search#/metadata/faff2281-1fca-4548-89d8-c8ec0c507bc7](https://sdi.eea.europa.eu/catalogue/srv/eng/catalog_search#/metadata/faff2281-1fca-4548-89d8-c8ec0c507bc7).

### Copernicus Global Land Cover

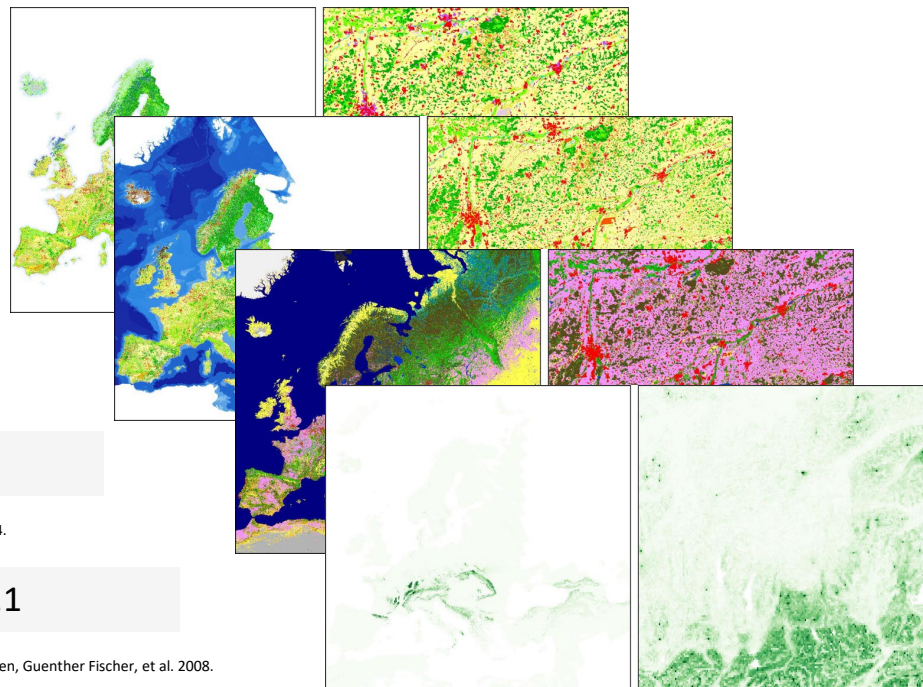
Buchhorn, Smets, Bertels, Lesiv, Tsendbazar, Herold, and Fritz. 2019. "Copernicus Global Land Service: Land Cover 100m: Collection 3: Epoch 2019: Globe." <https://land.copernicus.eu/global/products/lc>.

### Global Potential Natural Vegetation Maps

Hengl, Tomislav. 2018. "Global Maps of Potential Natural Vegetation at 1 Km Resolution." Harvard Dataverse, V4. <https://doi.org/10.7910/DVN/QQHCK>.

### Harmonized World Soil Database Version 1.1

Nachtergaele, FO, Harrij van Velthuizen, Luc Verelst, NH Batjes, JA Dijkshoorn, VWP van Engelen, Guenther Fischer, et al. 2008. "Harmonized World Soil Database (Version 1.0)." <https://www.fao.org/3/aq361e/aq361e.pdf>.





# CCE Ongoing Activities for Workplan 22/23 (3/3)

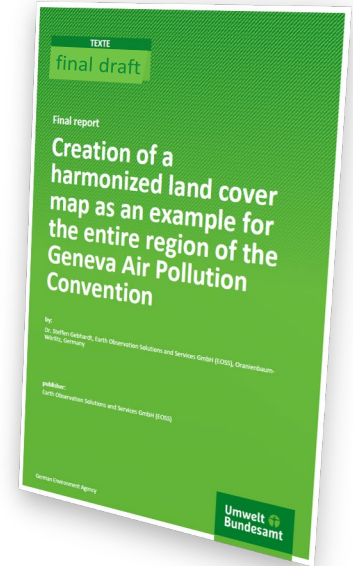
Harmonization of the Receptor map for Europe – nearly completed

## Completed

- Update important input data for e.g. background database and the EMEP/MSC-W model
- Update of the receptor map is completed and will be soon made available
- Report publication expected in October/November 2023
- maps at a national level or for the complete domain can be made available upon request to the CCE

## Ongoing activities

- Further updates (soil data and forest growth) for the implementation within the background database including EECCA region → **Proposal WP 24/25**
- Update of the Mapping Manual (short paragraph which describes the old receptor map)





# CCE Ongoing Activities for Workplan 22/23 (1/2)

Empirical Critical Loads: Review and revision of the CL<sub>emp</sub> N – completed

Publication of report [Review and revision of emp. CL of N for Europe | UBA](#)

Press releases UBA and CLRTAP

- [Ecosystems more sensitive to nitrogen pollution than previously assumed - Study | UBA](#)
- [Study confirms ecosystems more sensitive to nitrogen pollution than previously assumed | UNECE](#)

## Ongoing activities

- Call for data 2023 → ask NFC to apply on national territories and send data for a combined European dataset
- Many countries are applying revised 2022 CL<sub>emp</sub> N already, in a heterogeneous way, e.g. using lower end of the range or middle point of the range (or expert judgement, etc.)
- Application together with the revised receptor map, test the application of ranges

→ Report for **WP 24/25** (and illustrative publication with map server and pictures)



# CCE Ongoing Activities for Workplan 22/23 (2/2)

Empirical Critical Loads: Review and revision of the CLemp N – completed

→ Report for **WP 24/25** (and illustrative publication with map server and pictures)

Propose change of wording in the draft workplan:

1.1.1.22 Empirical Critical Loads: **illustrate and** map exceedance data, including CfD 23/24 outcome and updated 202**3** receptor map

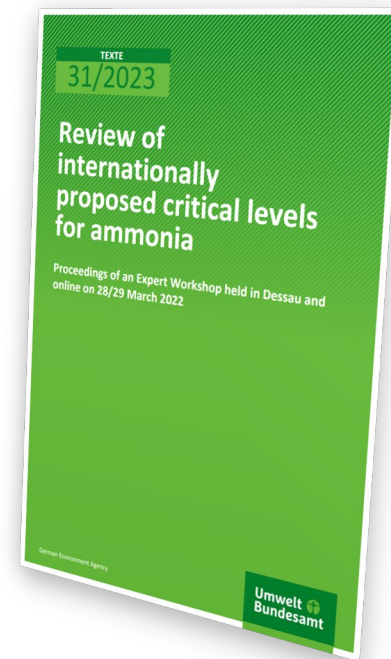


# CCE Ongoing Activities for Workplan 22/23 (1/4)

Critical Levels of ammonia : literature review and empirical data provision supporting a workshop - completed

## Publication of Workshop report

- Workshop in March 2023 ([link](#)); 145 registered participants
- Update of 2006 Workshop knowledge
- Main conclusions : no update necessary of critical levels
- Report: <https://www.umweltbundesamt.de/publikationen/review-of-internationally-proposed-critical-levels>

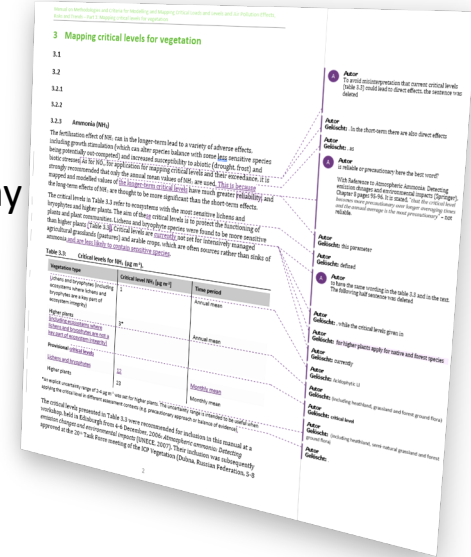


# CCE Ongoing Activities for Workplan 22/23 (2/4)

Critical Levels of ammonia : literature review and empirical data provision supporting a workshop - completed

## Update of the Mapping Manual - process

- Results of the workshop presented to the ICP M&M meeting in May 2022 and the WGE/EMEP Meeting in September 2022
- CCE invited a drafting group to take the latest knowledge up into the Mapping Manual (December 2022)
- Online meetings of the drafting group (26th January and 3rd February 2023)
- Members: U. Dragosits, J. Franzaring, M. Geupel, F. Hayes, M. Jones, D. Kelleghan, R. Meier, A. Moravek, M. Perring
- Discussion and approval by ICP Vegetation (13th – 15th February)
- Discussion and approval at ICP M&M meeting in 28-30 March 2023

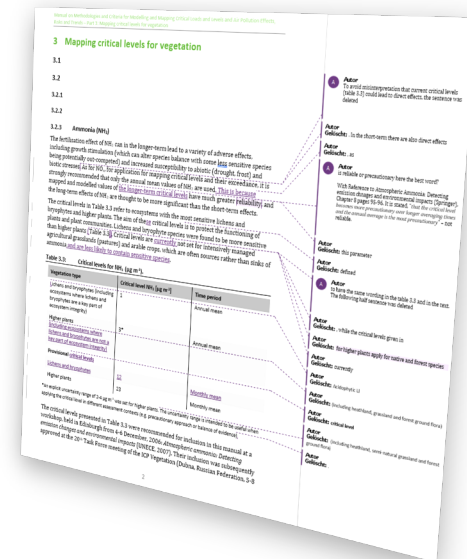


# CCE Ongoing Activities for Workplan 22/23 (3/4)

Critical Levels of ammonia : literature review and empirical data provision supporting a workshop - completed

## Update of the Mapping Manual – decisions at ICP M&M meeting (March 2023)

- **Informal doc: Mapping critical levels for vegetation (with track changes)**
- Reference to the Dessau workshop and deletion of earlier workshop from 1990s
- Perpetuation of current longer-term critical levels
- Uptake of a provisional monthly critical level for lichens and bryophytes ( $12 \mu\text{g m}^{-3}$ )
- Review, update and concretion of the used “scientific terms”
  - Vascular plants instead of “higher plants”;
  - Avoidance of the term “lower plants”, because lichens aren’t plants
  - implementation of a clear differentiation of lichens and vegetation





# CCE Ongoing Activities for Workplan 22/23 (4/4)

Critical Levels of ammonia : literature review and empirical data provision supporting a workshop

## Ongoing activities

- Get approval of the suggested changes by WGE/EMEP and EB
- Update of the mapping manual
- Mapping Critical Levels and their exceedances, together with interested NFC and based on the new receptor map

→ **Proposal for WP 24/25**



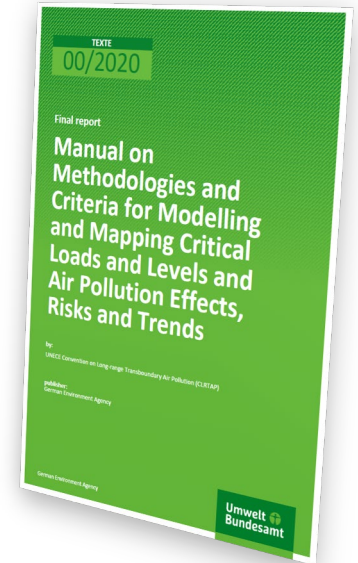
# CCE other Ongoing Activities

## Manual Updates

- Layout, copy-editing and accessibility standards
- Continuous document
- Revision of section 5.2 Empirical Critical Loads
- Revision of Chapter 4 “Mapping of Effects on Materials”
- Deletion of very outdated contacts for “further advice” under chapter 2
- ICP Vegetation Scientific Background Documents as annexes

## Upcoming updates:

- NH<sub>3</sub> Critical Levels
- Receptor map







# CCE other Ongoing Activities

Steady-state Critical Loads for acidification and eutrophication

## Critical Limits review - work is ongoing

- Project on the review of Critical Limits for SMB calculation of Critical Loads together with UBA Wien (Austria)
  - Acidification : update not deemed necessary Eutrophication Limits were discussed at an Expert Workshop (Dec. 2022)
  - Report in 2023
- UBA-Project on the climate sensitivity of CL on German Level II Plot Critical Loads (seepage rate, temperature and weathering rate)
  - Report in 2024

**Outlook WP 24/25 →** Launch of a Call for Data 24/25: update of SMB CL  
and policy relevant CL dataset



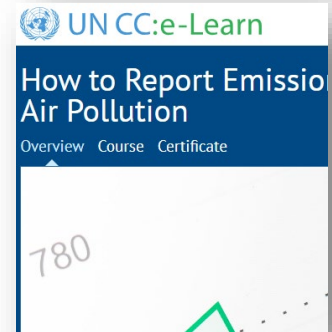


# Outreach activities: e-learning on effects-based activities (1/2)

Options for the development of a new course on air pollution effects work

## New form of capacity building

- The secretariat has recently developed two e-learning courses with good demand
  - e-learning starter course on the Convention and its three most recently amended protocols
  - e-learning course on emission inventory development
- The idea was born, to add a new course to make the effects-related knowledge and expertise under the Convention more accessible
- Capacity building for assessing risks of air pollution on ecosystems and health (EECCA, Western Balkan, Global outreach)
- What has happened so far: discussions within WGE Bureau, with WGE Chair, with the secretariat and potential funding institution (UBA Germany)





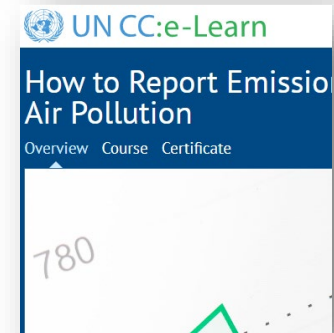
# Outreach activities: e-learning on effects-based activities (2/2)

Options for the development of a new course on air pollution effects work

## Options to organize the work

- Administrative coordination and management by the secretariat → existing knowledge and infrastructure
- Technical coordination by CCE → ICPs/TF provide technical knowledge
- Funding through German advisory assistance program for EECCA countries (80%); Co-funding 20 % → application after EB decision in early 24
- Finalization (and translation?) in 25

→ **Proposal WP 24/25**



# Proposals for next WP 24/25 (ECE/EB.AIR/WG.1/2023/6)

1.1.1.20	Define Dynamic Modelling indicators for protection of biodiversity and Dynamic Modelling outputs	Instructions for 24/25 CfD	ICP M&M, CDM	IVL
1.1.1.21	Launch 24/25 CfD to: (a) update SMB CL; and (b) include dynamic modelling of biodiversity	CfD: results to be included in CCE status report	ICP M&M, CCE, CDM	UBA, IVL and recommended contributions
1.1.1.22	Empirical Critical Loads: map exceedance data, including CfD 23/24 outcome and updated 2022 receptor map	Included in CCE status report	ICP M&M, CCE	UBA and recommended contributions
1.1.1.23	Update policy relevant CL data set based on outcomes of items 1.1.1.21–1.1.1.22	Dataset: results to be included in CCE status report	ICP M&M, CCE	UBA
1.1.1.24	Critical Levels of NH <sub>3</sub> : map exceedance data	Included in CCE status report	ICP M&M, CCE	UBA
1.1.1.25	Update background database for EECCA (with, e.g., updated 2022 receptor map)	Included in CCE status report	ICP M&M, CCE	UBA