

UN ECE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

International Cooperative Programme on Integrated Monitoring of Air Pollution Effects on Ecosystems

34th Task Force Meeting, 6 May 2026, Windermere, UK

Attending in person (as per attendance list):

Ulf Grandin (Sweden), James Kurén Weldon (Sweden), Jonas Sitte (Germany), Line Grottian (Germany), Angelika Kölbl (Germany), Barbara Albiniaak (Poland), David Elustondo (Spain), Lieke Vlaar (Netherlands), Pavel Kram (Czechia), Hampus Markensten (Sweden), Jussi Vuorenmaa (Finland), Radek Lhotka (Czechia), Pernilla Rönnback (Sweden), Thomas Cummins (Ireland), Ika Djukic (Austria).

Attending online:

Anna Degorska (Poland), Thomas Plha (Germany), Kairi Lohmus (Estonia), Victoria Vertyankina (Russia), Sergey Gromov (Russia), Brendan Wall (Ireland), Yvonne English (Ireland), Tara Sweetman (Ireland).

1. Opening of the meeting

Mr Ulf Grandin opened the meeting. An introduction round was held where all participants gave their name and affiliation.

2. Drafting and approval of the voting list

An attendance and voting list was circulated, ensuring that each participating country has one vote. All participants retained the right to speak.

3. Approval of the agenda

The proposed agenda was reviewed, no amendments were suggested and it was formally adopted by the meeting.

4. Approval of minutes from the 33rd IM Task Force meeting

The minutes were distributed by mail to all participants in the 33rd TF meeting and to all National Focal Points, and are available on the ICP IM web site at the programme centre:

<https://earchive.slu.se/items/9f50b1ab-8793-46c6-9ffb-5fe2b19ad69f>

The meeting approved the minutes

5. ICP IM Staff

The staffing of the Programme Centre has not changed since last year's meeting. Chair: *Ulf Grandin*, Head of Programme Centre: *James Kurén Weldon*, Senior researcher: *Martyn*

Futter, Database: Pernilla Rönnback and Hampus Markensten and expert on heavy metals: Karin Eklöf.

6. Report from the WGE and EMEP Extended Bureaux (Geneva, March 2026)

Mr Ulf Grandin gave a report of the key points from the WGE/EMEP Extended Bureaux meeting 2026:

- A discussion of long-term, non-binding aspirational goals was held, and “*No exceedance of critical loads*” was suggested.
- New ex-post analyses on updated deposition scenarios are expected to give only minor changes for biodiversity outcomes.
- Cost-benefit analysis shows benefits (especially health) clearly exceed costs of reduced emissions.
- Proposal for an interactive map of monitoring stations on the WGE website was well received. This would be part of the WGE web site: <https://unece-wge.org/>
- Discussions on innovations and future monitoring included:
 - AI-based modelling,
 - drones,
 - new air pollution measurement methods.
- It was noted that reduced or static funding for ICP centres and no increase for many years means very large real terms reductions.
- Future work plans will include essential but unfunded activities to make this gap visible (presently unfunded core activities are not included)
- Funding for the CLRTAP secretariat in Geneva remains uncertain and partly relies on reserve funds. The secretariat is essential for the whole convention, bringing all parts together, so this is concerning.
- WGE is seeking an additional Vice Chair and welcomes nominations.

7. IM data submission and database status

Mr Hampus Markensten updated the meeting on the current state of the database and submissions. Twelve countries have reported data from 2024, from in total 42 IM sites. All reported files are validated, and validation reports have been sent to all countries. About half of the reported files are approved for import into the database. The rest of the files need some correction and have been sent back to the responsible focal points. Data should be submitted in the format specified in the latest version of the IM manual.

Decision approved

The Task Force decided that data from 2025 should be submitted at the latest by 1 December 2026, in accordance with the IM manual.

As of 2026 submission we are moving to data submission based on the GBIF names and codes. The PC has developed a translation table (an Excel sheet) that includes all species

included in the data so far- if new species occur the NFP will have to consult the GBIF homepage for the appropriate name and code. The PC will make the translation table available to everybody (by publishing on the IM website and emailing to NFPs).

To correct data if needed, first get an extract from the PC as this includes a unique Sample_ID that makes integrating the corrected data in the database much easier. Mr Hampus Markensten will inform where needed about preferred routines for submitting revised data that did not pass the initial data validation.

Both new data and old data corrections are currently being done. There has been a pause to develop data import routines, but this is now complete so the amount of data available will make a significant jump in the near future.

7b. Other data issues. Sub-programme VG

In 2010, a new reporting template was adopted for sub-programme VG (raw data instead of mean values). The 2010 TF meeting decided to re-report old data in the new format. However, it was recently discovered that the re-reported data was never incorporated in the database. There are now vegetation data in sub-programme VG in two different formats, without any flag or comment indicating which reporting format that is used.

Decision approved

- Countries with VG data in the old format in the IM database should, if raw data are accessible, re-report these in the new (2010 and on) format.
- The programme centre will inform affected countries

7c. Other data issues. Data quality control

Mr James Kurén Weldon gave a short presentation on how large language models (LLM) can be used for identifying potential issues in databases. There was some discussion around how much this adds over scripting checks, but there is potential for finding errors that were not included in the checks (as it is hard to include all possible problems in a script). Mr Thomas Cummins raised potential data privacy issues, Mr James Kurén Weldon answered that as long as the models are only given access to open, published data this is not an issue.

8. The 2026 IM Annual Report

Mr James Kurén Weldon gave an update on the 36th annual report, which is under preparation. Each country was encouraged to submit at least half a page on the current state at their IM sites. Small highlights on new relevant results are also very welcome, and may be e.g.:

- Summary of an Open Access article
- Summary of other studies, e.g. student projects
- Translated summaries of national reports originally published in languages other than English

All contributions should be sent to the Head of Programme Centre [James Kurén Weldon](#). The deadline for material is 10th August, but earlier submissions are much appreciated.

9. Tour de table

Short oral presentations from each present National Focal Point about the national IM network and monitoring were given:

Spain (Mr David Elustondo) – Work continued with monitoring as usual, and it was possible to install some new equipment. The aim is to automate as much as possible and integrate remote sensing (they are also active in the working group on remote sensing in ICP Forests). They have applied for a project to integrate automated sensing/remote sensing with Lifewatch, and are also aiming to join the eLTER RI.

Germany (Mr Thomas Plha) – Noted that there are currently funding challenges as programs are required to justify their budgets in the face of cutbacks.

Netherlands (Ms Lieke Vlaar) – Did not provide a separate update as a presentation on the Netherlands joining the extended IM network was held at the joint session with ICP Waters earlier the same day (see separate minutes for details).

Sweden (Ms Pernilla Rönnback) – The budget situation is stable. The Swedish sites began a mercury campaign (focussed on deposition and surface water) with funding for one year so far, with the possibility to extend it. In addition, the IM sites SE04 Gårdsjön and SE14 Aneboda are involved in a national project where the occurrence of PFAS in soil and water (deposition/ground/surface water) is investigated. The project is led by the Geological Survey of Sweden. The annual report has been published for the year and data for 2024 published.

Austria (Ms Ika Djukic) – There is lichen monitoring planned for this year at Zöbleboden, and data for lichens, vegetation and birds are published via GBIF. Data from the site were used in a Nature paper on climate change effects on vegetation published this year. Another focus currently is implementing the new biodiversity Standard Observations from the eLTER RI (including acoustic monitoring and eDNA).

Ireland (Mr Thomas Cummins) – Ireland is planning on joining extended IM with a number of level 3 sites.

Czechia (Mr Radek Lhotka) – the two Czech sites are running as normal. Funding is stable, and it was noted that the connection to NECD reporting helps in this regard.

Poland (Ms. Barbara Albinia) – 12 currently active sites which are mostly in forests but in different landscapes from seashore to mountains. 7 stations were already active from the 1990s. IM is a governmental program in Poland, and 10 institutions are involved in the work. Some national parks may be also interested in joining. It was noted that there are financial issues in some parts of the monitoring.

Finland (Mr Jussi Vuorenmaa) – The 3 active sites in Finland are running well, and all sites also belong to national emissions network. Many publications are using IM data.

10. Main activities since last meeting

The chair and/or head of programme centre has represented IM at the following major meetings:

- The tenth joint EMEP and WGE September meeting in Geneva
- the joint EMEP Steering Body and WGE Extended bureaux meeting

- Task Force meetings for ICP M&M/CCE/CDM and ICP Forests
- eLTER Scientific Conference. Several presentations from people connected to ICP IM. Discussions on cooperation between WGE and eLTER.

Other main activities include:

- Modelling of plant species behaviour under different deposition scenarios as the contribution from IM to the ex-post analysis under the on-going revision of the Gothenburg protocol.
- An update of the IM manual
- Making the IM database openly available.

All activities will be listed in the IM Annual Report, that will be available at the ICP IM web site: www.slu.se/en/icp-im.

11. Previous work plan (2024/25)

Mr Ulf Grandin updated the meeting on the previous and current workplan. The 2024/25 WGE workplan included six items for IM (status in parentheses):

- Scientific paper on effects of N and S deposition on vegetation community stability over time (draft manuscript)
- Elaborate scientific paper/report on:
 - a) trends in HM fluxes across ICP IM sites (Draft manuscript)
 - b) assessment of mercury data gathered by new passive samplers (delayed)
- Make ICP IM database open access under feasible licence and principles, and publish an associated data paper (completed)
- Initiate rolling revision and update of IM manual. (revision started)
- Provide an update on long-term changes in atmospheric deposition and runoff water chemistry of sulfate, inorganic N and acidity (published)
- Proof of concept for development of above-ground vegetation monitoring in ICP IM sites using drone remote sensing (cancelled, no funding)

12. Current work plan (2026/27)

The 2026/27 WGE workplan includes five items for IM (status in parentheses):

- Analysis of functional trait responses to deposition as a measure of impacts on biodiversity (started)
- Assess trends in HM fluxes across ICP IM sites (started)
- Assessment of mercury data gathered by new passive samplers (pending)
- Continued revision of the IM manual (rolling revision)
- Update of long-term trends in sulphate and inorganic nitrogen mass balance budgets (planned for 2027)

Mr James Kurén Weldon stressed that all members of ICP IM are welcome and encouraged to participate in these projects and the publications that come out of them.

13. Cooperation with eLTER

The co-operation between WGE and eLTER was established through a formal letter of co-operation and continues in various ways. One example is the eLTER Standard Observation protocols, of which many are based on WGE protocols (IM, Waters and Forests). The eLTER protocols will lead to further large-scale harmonisation of monitoring methods and data reporting, for mutual benefits in data analyses and research.

14. The Gothenburg Protocol

Mr Ulf Grandin updated the meeting on the history and current status of the Gothenburg Protocol. The original 1999 Protocol set national emission ceilings for 2010 up to 2020 for four pollutants: sulfur (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and ammonia (NH₃). The protocol was amended to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond. The revised Protocol will include emission reduction commitments for fine particulate matter, the pollutant whose ambient air concentrations notoriously exceed air quality standards throughout Europe, and is first international agreement on fine particles.

A new revision round was decided by Parties of CLRTAP in December 2023. The main points for the new revision include:

- new emission reduction commitments, special emphasis on
 - black carbon
 - methane
 - ammonia
- potential revisions of annexes with regard to level of ambition and scope;
- approaches for non-Parties to facilitate ratification and subsequent implementation of the Protocol;
- targets to reduce risk to health and ecosystems;
- how to achieve integrated approaches among climate, energy and air policies.

One of the key tasks for WGE in the revision of the protocol is to analyse the effects of different deposition scenarios to inform decision makers. IM participated in the recent call for data and ex-post analysis and collaborated with CDM to produce a text based on dynamic modelling of the chemical and biological outcomes of the emissions reduction scenarios provided by EMEP.

15. The Extended IM

Mr Ulf Grandin updated the meeting on the Extended IM project. This is an opportunity for countries to join IM but with less intense monitoring, for having standardised protocols for e.g. NEC Directive monitoring.

As announced at the TF meeting last year, there was a revision in the extended IM text in 2025 including:

- a new chapter on participation and voting at TF meetings
- Reverse order of site labelling to harmonise with eLTER
 - Class 1: the most intense monitoring, today's full IM programme
 - Class 2: intermediate intensity
 - Class 3: the least intense – not catchment based

The revised version was included as an annex in the IM manual, instead of being a separate document.

The Netherlands has just joined. There has also been interest from Ireland, the UK, Poland, Norway, Sweden, Belgium, Denmark and Austria.

16. IM data availability

The IM Programme Centre has made the database publicly available, under a [Creative Commons](#) by attribution licence and aiming to meet [FAIR](#) principles, in accordance with the signed permissions from participating institutes. As part of the process the Programme Centre has led the writing of a data paper describing the IM data, with co-authorship for data owners. The paper has recently been published. See: <https://doi.org/10.1038/s41597-026-07181-8>. Data from countries that have not (yet) signed the agreement about open data access, are still “by request only” as before.

17. The IM Manual

Mr Ulf Grandin updated the meeting on the revision process for the manual. During the 2022 revision of the IM manual and especially during the preparation of the new data validation routines, inconsistencies and outdated methods were discovered. Outdated methods included for example the taxonomic nomenclature and some chemical analyses. It was also noted that several methods for chemical analyses have no reference.

In addition to incomplete or outdated methods, some variables are reported as highly aggregated mean values. Several of the aggregated values in the database are probably not useful in any contemporary research. To address these shortcomings, IM started a rolling revision of the manual in 2025. The first in a series of revisions included a new standard for taxonomy and a revision of the sub-programme BI.

The new standard for taxonomy is GBIF - Global Biodiversity Information Facility. The core taxonomic nomenclature in the IM database is the numerical GBIF taxon-ID, but the manual also requires the associated scientific name (in GBIF) in addition to the numeric code.

The revision of sub-programme BI includes a shift from highly aggregated to raw data on tree measurements. The new format will comply with reporting by ICP Forests. The revised instructions also include an update of method for estimate of total mass of tree bioelements and wood in the catchment, based on upscaling from trees, to plots, to whole catchment. It also describes how to calculate the standard error of the estimates of total tree and bioelement masses.

High priority for the next revisions are meteorology (higher frequency/raw data submission) and some outdated or incomplete methods for chemistry (particularly alkalinity needs investigation).

18. Next Task Force meeting

The meeting noted that we are happy to continue joint meetings with ICP Waters.

19. Any other business

No other issues were raised.

20. End of meeting

Mr Ulf Grandin concluded the meeting and thanked participants for their contributions.

After the formal meeting concluded there was a demonstration of the tools for the shift from NCC to GBIF, with hands-on instructions (Mr Hampus Markensten). There were also group discussions and the formation and organisation of working groups for the continued revision of the manual. Groups discussed the following subjects:

- Meteorology
- Water chemistry
- Soil chemistry and other soil variables
- Ground vegetation.