

UN ECE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

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

33rd ICP IM Task Force Meeting, 24 April 2025

Dessau-Roßlau, Germany

Attending in person:

Ulf Grandin, (Sweden), James Kurén-Weldon (Sweden), Thomas Dirnböck (Austria), Sebastian Nied (Austria), Cornelius Oertel (Germany), Inken Kruger (Germany), Adéla Holubová Šmejkalová (Czech Republic), Marie Romer (Germany), Line Grottian (Germany), Angelika Kölbe (Germany), Barbara Albinia (Poland), Martyn Futter (Sweden), David Elustondo (Spain), Lieke Vlaar (Netherlands), Pavel Kram (Czech Republic), Hampus Markensten (Sweden), Thomas Scheuschner (Germany)

Attending online:

Anna Kaplina (UNECE), Victoria Vertyankina (Russia), Andrzej Kostrzewski (Poland), Mikołaj Majewski (Poland), Jussi Vuorenmaa, (Finland), Anna Degorska (Poland), Jesper Bak (WGE)

A. Formalities

1. Opening of the TF meeting

2. Approval of the agenda

Approved

3. Approval of the minutes from the 32nd ICP IM Task Force meeting, 2024

The meeting approved the minutes from the Task Force meeting in 2024. The minutes are available on the ICP IM web site at the programme centre:

<https://www.slu.se/globalassets/ew/org/centrb/im/2024/minutes-icpimtf-2024.pdf>

4. The ICP IM Staff

a) Chair

Mr Ulf Grandin informed the meeting that due to a change of employment and new duties, Salar Valinia has left his role as co-chair of ICP IM. The meeting thanked Salar for his valuable contributions to IM.

b) The Programme Centre

Head of IM Programme Centre: Dr. James Kurén Weldon

Senior researcher: Associate Professor Martyn Futter

Data base: Dr. Pernilla Rönnback and Dr. Hampus Markensten

Expert on heavy metals: Associate Professor Karin Eklöf

5. The IM web site

The international ICP IM web page is found at www.slu.se/en/icp-im.

The site has permanent links to all uploaded documents. However, due to Swedish regulations around accessibility, presentations and similar files will not be uploaded there.

B. Reports

6. The WGE and EMEP Extended Bureaux

Held in Ljubljana (and on-line), March 2025.

Mr James Kurén-Weldon gave a summary of the IM related issues at the meeting:

- A discussion around long term aspirational goals was held. Setting a single threshold is challenging, as all pollution causes some damage. Defining thresholds for forest health is difficult, and reduced nitrogen and sulfur deposition could even negatively affect forests in some respects. Critical levels are useful for policy, but defining zero pollution is problematic. Ecosystem-specific critical deposition values and non-exceedance were suggested. Ambitious long-term goals were supported, with the idea of separate emission reduction commitments and aspirational targets forming part of a long-term strategy - “no exceedance” suggested. The TF meeting agreed that “no exceedance” would be an appropriate long-term goal at a high level of ambition.
- A co-ordination group for specifying the form of the ex-post analyses for the Gothenburg protocol. Representatives from all ICPs requested. Mr James Kurén Weldon will participate from IM.
- Open data expert group is being formed. Mr James Kurén Weldon will participate from IM.
- It was noted that the budget for all ICPs and TFs has gone down considerably in real terms in the last 15 years, which has been partly hidden by the USD strengthening against Euro, SEK, NOK. If the USD weakens in coming years this will become very apparent.
- Thematic sessions on ex-post analysis, on long-term aspirational targets and on innovation and new technologies and an exchange of ideas on the promotion of the Convention will be organized at the eleventh joint session in September 2025.

7. The new IM logotype

Mr Ulf Grandin thanked all for comments received on the draft sketch after last year’s meeting. The final version of the new ICP IM logotype is used in the header of this document.

8. The IM database

Mr Hampus Markensten updated the meeting on the current state of the database and submissions. The international IM database is up and running, and the automatic data validation seems to work very well. Many fewer error reports were generated in the 2023 reporting than earlier years. Submission of data should be made to im-database@slu.se.

a) Data submission

12 countries have reported data for 2023. In total there were 227 submitted files. About half of the submitted files are already approved for import to the database. In 2024 there were more late submissions than 2023, so it would be very good if we can improve this next year. Please submit on time as it makes the task much easier for the data base managers Mr Hampus Markensten and Ms Pernilla Rönneback.

Data submission

From this year's reporting the programme centre only accepts Excel or .csv files.

The most important points for the reporting are:

- Submit only Excel or csv files (.xlsx or .csv), NOT txt. Excel is preferred.
- In the submitted data files, 1st row should be header, 2nd row and down should be the data. No other content.
- The reporting templates in the IM Manual contains some additional rows with information at the top. Remove these before submitting the file.
- Report one table per file (not multiple tabs in the same file).
- Data from the same subprogramme from multiple sites may be reported in the same table. In such case indicate country code (e.g. SE) in the first part of the name of the submitted file. If data from only one site, start the file name with the area code (e.g. SE14).
- Name the files:
countrycode/areacode_subprogrammecode_datayear
(example *SE_RW_2021.xlsx* or *SE14_RW_2021.csv*).
- The data submission should be through the National Focal Point or other assigned data provider.

Decision

- The Task Force decided that data from 2024 should be submitted at the latest by 1 December 2025, in accordance with the IM manual.

b) Database structure and validation reports

The technical development of the database continues. Development since last year include:

- Adding zeroes in front of numbers or characters in Station codes (SCODE), e.g.:
 - “0001” and “001” and “1” → “0001”
 - “A2” → “00A2”
- Completed the code for import of data to the database, including:
 - Check that data are not getting duplicated in the database
 - Translation of text to id-numbers for the database
 - Actual inserts into the database
- Added coloured text in the validation reports, to facilitate interpretation:
 - Blue markings of numbers
 - All other characters are black

Mr Thomas Dirnböck noted that the Programme Centre data team are going a great job, that the automated reports work very well, and that this is all much appreciated.

9. The Annual Report

Mr James Kurén-Weldon informed the meeting that the 34th annual report from IM is under way. Each country is strongly encouraged to submit at least half a page on current state at their IM sites. Short articles on new relevant results are also very welcome, such as summaries of recent scientific articles, reports, or student projects that use IM data. The deadline for material is 10th August, but earlier submissions are appreciated.

10. Tour de table

Participants informed the meeting of recent developments in their countries:

Austria (Mr Thomas Dirnböck) - Zöbelboden has been an IM site since 1993, and will soon be joining ICP Forests as well, with their intensive plots. Extensive climate research is conducted at the site. There is currently work underway on a broader assessment of N impacts on biodiversity, which should be finished by the end of the year, followed by a report to the 2026 Task Force meeting.

Germany (Mr Thomas Scheuschner) – Work is ongoing on an extension of the contract with the Thunen Institute. It was noted that it becomes harder to get funds for monitoring work, and perhaps a discussion of how to reduce some parameters to save costs is needed. What should be focused on if this is necessary is a question for the wider network as well.

Spain (Mr David Elustondo) – The site has continued with programmes, starting the BI subprogramme for the first time. Foliar damage assessments have also begun. The site is under a new institute at the University of Navarra and is part of the NEC directive monitoring network in Spain which has helped with funding. There is also a good chance of joining the LTER Spain network.

Netherlands (Ms Lieke Vlaar) – The commissioner that initially approved work under the NEC directive is keen on IM, but the budget is a problem, so the aim is to begin with Extended IM with the hope of adding more subprogrammes over time.

Czechia (Ms Adéla Holubová Šmejkalová and Mr Pavel Krám) – Two catchments are monitored, operated by different institutes and funded by internal sources and by the national government. One is a catchment in central Czech that was deforested by bark beetles and reforested in a more diverse way (replanting rather than natural regeneration is legally required here). At Lysina, work continues, although data is often delayed as the laboratory is very slow. This has recently improved though, as the laboratory has less external work so should be faster.

Poland (Ms. Barbara Albinia) – Poland has been in the IM network since the early 1990s, and there are 11 sites reporting to IM now. These are a collaboration between government and universities, with nine partners which organise the sites. Financing this work is a problem, as in most countries, although the network got some EU funding for measurement equipment, including upgrades of meteorological equipment that was very old. Foliage assessment is starting. Mr Ulf Grandin noted that it is great to see Poland attend the TF meeting in person, and that they are an important part of the IM network.

Finland (Mr Jussi Vuorenmaa, online) – There are three IM sites, run by the Finnish Environment Institute and Natural Resources Finland. ICP Forests and IM are also

harmonised at the sites, which provide data to both networks. At the most northern site monitoring started in 2006. The IM sites are also part of LTER, and NEC directive monitoring. In short, the future looks good continued for monitoring at these sites.

Sweden (Mr Ulf Grandin) – Financial challenges have been a problem, although an unexpected budget increase this year will allow updating equipment at the four IM sites.

C. Activities and development

11. Activities during 2024/25

Major meetings where IM participated:

- Six LRTAP related meetings:
 - ninth joint EMEP and WGE September meeting,
 - the EMEP and WGE Extended bureaux,
 - Task Force meetings for ICP M&M and ICP Forests
 - James Weldon participated in a workshop on modelling, held by CDM.
- eLTER all party meeting. IM hosted a workshop on harmonised monitoring protocols.
- XXVI IUFRO World Conference. IM had a booth together with other monitoring programmes at SLU (the affiliation of IM PC) and gave an oral presentation at the ICP Forests nitrogen session.

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.

12. The WGE work plan

a) The current work plan (2024-2025)

| IM activities in the WGE 2024-25 Work Plan | Status |
|--|-----------------------|
| Elaborate scientific paper on effects of N and S deposition on vegetation community stability over time | In progress |
| Elaborate scientific paper/report on: (a) trends in HM fluxes across ICP IM sites; and (b) assessment of mercury data gathered by new passive samplers | Delayed to 26/27 |
| Make ICP IM database open access under feasible licence and principles, and publish associated data paper | In progress |
| Initiate revision and update of IM manual | In progress |
| Provide update in long-term changes in atmospheric deposition and runoff water chemistry of sulphate, inorganic N and acidity | In progress |
| Elaborate proof of concept for development of above-ground vegetation monitoring in ICP IM sites using drone remote sensing | Cancelled, no funding |

b) The 2026-27 work plan

Mr Ulf Grandin presented the proposed 2026-2027 work plan, which is to be finalised at the 2025 September meeting in Geneva (with a draft due by May 10). The last workplans have had most weight on biodiversity assessments, as an effect of the expertise of IM chair and head of programme centre. We now aim at studies of more catchment-based processes which is one of the core functions of IM. The meeting was

asked if there are there any ongoing/planned projects that can additionally be included in the workplan.

| Suggested IM activities for the WGE 2026-27 Work Plan |
|--|
| Analysis of long-term trends in sulphate and inorganic nitrogen mass balance budgets |
| Analysis of functional trait responses to deposition as a measure of impacts on biodiversity |
| Assessment of mercury data gathered by new passive samplers (roll over) |
| Trends in HM fluxes across ICP IM sites (roll over) |
| Continued revision of the IM manual |

Mr Thomas Dirnböck asked for more information on which data is in the PC database from the sites, as it would be good to know which data you need for the planned activities so we can gather in more participating sites, who may have data locally.

Otherwise, the proposed workplan was agreed as presented.

13. Cooperation with eLTER

Mr Ulf Grandin updated the meeting on the co-operation agreement with the eLTER RI, which is proceeding. For example, eLTER is currently defining its standard observation protocols, many of which are based on WGE protocols (IM, Waters and Forests). This process also involves much work developing standardized metadata, which will be very useful to us in the open publication of our data, a mutual benefit. The eLTER protocols may also lead to further large-scale harmonisation of monitoring methods and data reporting. The eLTER Science Conference upcoming in late June.

14. The Gothenburg Protocol – Explanation and Update

Mr Ulf Grandin updated the meeting on the revision of the Gothenburg Protocol. The original 1999 Protocol sets national *emission ceilings* for 2010 up to 2020 for four pollutants: sulphur (SO₂), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and ammonia (NH₃). The protocol was amended in 2017 to include national *emission reduction commitments* for 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. The 2012 amendment came into force October 2019.

A new revision round was decided by Parties of CLRTAP in December 2023.

Main points for the new revision:

- 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.

The ICP's are requested to provide data and evaluations on long term effects in monitored ecosystems. ICP IM is providing high resolution data to modellers in both IM and in other bodies under CLRTAP for e.g.:

- Scenarios and future strategies
- Ex-post analyses
- Catchment based detailed studies of ecosystem functions and fluxes

ICP IM is working with CDM in the current call for data and running dynamic models based on the new emissions scenarios produced by MSC-W.

15. Extended IM

Mr Ulf Grandin updated the meeting on the Extended IM project, which is an opportunity for countries to join IM but with less intense monitoring, for e.g. NEC directive monitoring.

Planned smaller revisions during 2025 to the Extended IM documents:

- Add a chapter on participation and voting at TF meetings to make clear that if a country is providing data, then they are most welcome to attend TF meetings and have voting rights.
- Reverse order of site labelling to harmonise with eLTER
 - Class 1: the most intense monitoring, today's IM programme
 - Class 3: the least intense.

The Netherlands is close to joining. There has also been interest from Poland, Norway, Sweden, Belgium, Denmark and Austria.

These changes were approved by the meeting

Ms Lieke Vlaar asked about habitat description, and whether new sites need to provide a standardised form for site information. Mr James Kurén-Weldon answered that the PC has this information from existing sites but a template to make clear what is needed would be very useful and the PC will develop one.

16. IM data availability

There is an increasing awareness of the need for sharing research and monitoring data, with all kinds of stakeholders. There is also a request from WGE to make data more available.

The 2024 IM Task Force meeting decided to:

- mandate the IM Programme Centre to make the database publically available , under a [Creative Commons](#) by attribution licence and aiming to meet [FAIR](#) principles, in accordance with the signed permissions from participating member countries.
- mandate the Programme Centre to draft a data paper describing the publically available IM data, with co-authorship for data owners.

Mr James Kurén-Weldon informed the meeting that this work is in progress and will be finalised during 2025.

17. Revision of the IM manual

Mr Ulf Grandin updated the meeting on the revision process for the manual. During the last revision (2022) and especially during the preparation of the new data validation routines, inconsistencies and outdated methods were discovered. Outdated methods include e.g. the taxonomic nomenclature and chemical analyses, for example alkalinity. 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. If we aim at making the data publically available, the data must be at a resolution that can interest external users, which some reported variables currently are not.

Taxonomy

For all subprogrammes that report species, the taxonomy is based on one of the best taxonomic references available when the first version of the manual was drafted, the Nordic Code Centre (NCC). However, this centre has ceased to exist and cannot be accessed anymore.

The Task Force meeting is thus suggested to decide on leaving NCC and instead use the Global Biodiversity Information Facility (GBIF) as new standard for species taxonomy.

Decision

- The IM Programme Centre is mandated to implement a shift from Nordic Code Centre to Global Biodiversity Information Facility as the basis for all species taxonomy and nomenclature and update all relevant parts of the manual.
- The IM Programme Centre will provide tools and instructions to NFPs to facilitate reporting according to GBIF.
- The new format should be used for the reporting of data from 2024 and onwards.
- The programme centre will revise the nomenclature of already reported data.

Overly aggregated data

Subprogramme BI (Tree population and tree bioelements)

A final version of a revised manual of the subprogramme BI variable was distributed to all participants before the meeting and also presented at the meeting. The main change is reporting of diameter of all individual trees on the monitoring plots instead of number of trees of a certain species within a diameter interval of 5 cm, e.g. number of spruces with a diameter between 10 and 15 cm. This will allow more accurate estimates of total biomass and elements in the biomass, needed for catchment budgets. The revision also includes estimates of the standard error for upscaling tree biomass and bioelement mass on the plots to the whole catchment, and equations for these calculations. The revision is only about data treatment and reporting. All field measurements are as in the current version.

Decision

- The Task Force adopted the suggested revision of subprogramme BI of the IM manual, with a mandate to the Programme Centre to make final adjustments according to other decisions regarding taxonomy at the 2025 Task Force meeting.
- The revised version should come into force for the reporting of 2024 data, due 1 December 2025.
- Parties should re-report previously submitted BI data in the new format, at the latest 1 December 2026

So far there is only Swedish data in the international database, but more countries that measure trees are encouraged to submit or resubmit data.

Subprogramme ME (Meteorology)

Variables in the ME subprogramme are reported as monthly mean values. This is too aggregated for any scientific evaluations. It is suggested to change the aggregation to daily mean values.

Suggested way forward

- The Programme centre draft an updated version based on current manual and/or selected parts of eLTER and ICP Forests' manuals.
- No change of field measurements, only in reporting format.
- Expert group from IM to review the draft – Any volunteers?
- Final version ready for decision by the Task Force in 2026, and annual reporting in the new format the same year.
- Re-report of old data by the general reporting deadline in 2027.

The meeting agreed these proposals as a way forward, rather than an immediate formal decision. Ms Inker Kruger noted that it would be good to have minimum and maximum values for the daily data also. This was agreed.

Outdated or incomplete methods

Some methods, mainly for chemistry, are outdated or incomplete. Identified issues include:

- Alkalinity – to be investigated further
- Some methods for chemical analyses which have no reference.

Mr Ulf Grandin suggested forming an expert group for a gradual revision of the chemistry variables and methods, aiming at a decision on the revised manual for the most urgent matters at next year's TF meeting.

Mr James Kurén-Weldon noted that this can have a simple solution like adopting the ICP Forests or eLTER protocol rather than rewriting it ourselves. Mr David Elustondo offered to consult on this.

18. Next Task Force meeting

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

19. Other business

No points raised

20. End of meeting

Mr Ulf Grandin ended the meeting and thanked all for valuable contributions to the discussions.

After the formal meeting concluded there was a demonstration of the tools for the shift from NCC to GBIF based taxonomy (a spreadsheet that will be sent out to all NFPs).

There were then group discussions about the revision of the manual. Some informal notes follow:

- **Meteorology**

The methodology itself is straightforward and well established, and largely shared between ICP Forests and IM, becoming even closer with the proposed change to daily data reporting. It is important to be clear on reporting format (i.e. not a random mix of UTF-8 ASCII, csv...). Raw data versus interpolated – ICP Forests use raw data, and it is better if everyone who wants to use the data has access to raw data and a coherent gap filling process. Clarity was requested on how far away can a “nearby” weather station be if data from there can be used instead of onsite measurements?

- **Water chemistry**

The manual says nothing about the chemical methods, which is a problem. The starting point is to use the methods of ICP Forests, who are constantly updating and quality assuring their methods – these are often based in turn on ISO methods. Runoff water doesn't exist in ICP Forests but maybe we can adopt the ICP Waters manual in this case.

- **Soil chemistry and other soil variables**

There is a need for guidance in the manual on an increased frequency of measurement after e.g. a major disturbance or other event. The use of TMS data loggers continuously monitoring humidity and temperature in the topsoil could be useful. There was also a proposal for a new soil biology subprogramme, based on eDNA, which could be based on the eLTER protocols.

- **Ground vegetation**

Suggestion to include mosses only at sites where they are functionally significant. As the VG subprogramme is rather demanding, and therefore not in place at many sites, there could be a role for an optional VG simple subprogramme with less frequent measurement, or 8 subplots instead of the current 16 or 32. Something that is cheaper and simpler is clearly needed as few sites report it, despite it being “mandatory”.