

## 37<sup>th</sup> Task Force Meeting of the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)

Birmensdorf, Switzerland, 10–11 June 2021  
Hybrid Meeting

### Minutes

#### Opening

1 The 37<sup>th</sup> Task Force Meeting (TFM) of ICP Forests was hosted by the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. It was held as a hybrid meeting, with 60 participants from 27 countries (see Annex I) either physically or virtually attending.

2 Mr Christoph Hegg, Acting Director of WSL, and Ms Juliane Beez, lead country representative from the Federal Ministry of Food and Agriculture in Germany, welcomed all participants to the meeting. Mr Paul Steffen, Vice Director of FOEN, had welcomed the Task Force already at the conference dinner the previous day.

3 Mr Marco Ferretti, Chairman of ICP Forests, opened the meeting and welcomed all participants from the ICP Forests/WGE community and other external bodies on behalf of the ICP Forests and WSL. He expressed his gratitude to Mr Peter Waldner (NFC Switzerland), Mr Marcus Schaub (Chair of the Scientific Committee), and several colleagues from the host institute WSL; the Swiss Federal Office for the Environment (FOEN); and the Programme Co-ordinating Centre of ICP Forests (PCC) for organising the meeting.

#### Item 1 Adoption of the Agenda and of the Minutes of the Last Task Force Meeting

4 The Task Force adopted the agenda of the meeting and approved the minutes of the 36<sup>th</sup> Task Force Meeting.

#### Item 2 Report by the Programme Co-ordinating Centre (PCC) on Activities and Progress since the 36<sup>th</sup> TFM

5 Mr Kai Schwärzel, Head of the PCC, welcomed all participants on behalf of the PCC and thanked all organisers of ICP Forests meetings and contributors to the ICP Forests reporting during the last year. Five ICP Forests reports were published in 2020<sup>1</sup>. ICP Forests members also contributed to the publication of the State of Europe's Forests 2020 report<sup>2</sup> by Forest Europe. The **2021 Technical Report (TR)** was made available two weeks before the meeting. Suggestions for changes can be sent to the PCC by 24 June 2021. If no substantial comments are made, the TR 2021 will be regarded as approved by this deadline. The latest **ICP Forests Brief No 5** is again under revision by the authors and PCC, who carefully evaluate all comments and suggestions sent by the NFCs and Ministries and discuss them with the respective colleagues. If the Brief will be substantially changed, it will be distributed among the NFCs and Ministries again for approval. All ICP Forests publications from the last reporting period are available from the ICP Forests website<sup>3</sup>.

---

<sup>1</sup> <http://icp-forests.net/page/publications>

<sup>2</sup> <https://foresteurope.org/publications/>

<sup>3</sup> <https://icp-forests.net>

6 Mr Schwärzel presented the status of the expected outcomes/deliverables of the **2020-2021 Workplan** under the UNECE Air Convention, which focusses on ozone flux-response relationships, N deposition effects on forest vegetation, and the status and trends of heavy metals (HM) in forest ecosystems. All deliverables are well underway or have already been finalised. He showed the proposed topics for the **2022-2023 Workplan** which were developed together with the EP chairs:

Activity description/objective	Expected outcome/deliverables
<b>Nitrogen deposition</b> and its effects on forest health, productivity, carbon sequestration, and biodiversity	Report and scientific paper about status and trends of N levels in European forests (2022, 2023) Responses of European forest ecosystems to decreasing nitrogen deposition
Status and trends of <b>heavy metals</b> in forest ecosystems	Scientific paper on heavy metal concentrations in Level I plots across Europe
<b>Air pollution</b> -related cause-effect relationships in forests in a <b>changing climate</b>	Scientific paper on the impact of climate on foliar nutrition in European tree species
<b>Ambient ozone levels</b> and effects on forest health, productivity, carbon sequestration, and biodiversity	Report on the effect of air pollution on forest health and productivity

7 Mr Schwärzel presented the questions which ICP Forests was asked to address within the next two years under the **review of the Gothenburg protocol**. These will feed into several reports under the Convention: (1) What is the annual change (or change every 5 years) in water, soil and ecosystem quality indicators between 1990 and 2018/2019? What are projected changes up to 2030 and beyond? (2) What are the observed and projected trends in vegetation risk of damage due to ozone (using various metrics? The summary of these fact sheets needs to be sent to the WGE by June 22; the PCC sends these to the NFCs with a request for review prior to submission to the WGE.

8 The PCC hired two **new members of staff** temporarily: Ms Catherine Hilgers is a data scientist hired e.g. for the preparation of the Ecological Studies book; Ms Katrin Haggmüller is a data manager who will support the Data Unit.

9 Mr Schwärzel presented the **financial statement 2020** with a total of USD 126,200.00 having been spent on PCC staff and operating costs.

### Item 3 Optimising Data Requests

10 Ms Anne-Katrin Prescher (PCC) presented three proposals for optimising data requests submitted to the PCC:

- (1) **Optimising the response time of data requests.** The Task Force approved that the time for pooling requests by the PCC and for approval by the NFCs is shortened to 2 weeks each, which will reduce the time of data provision from up to 8 weeks to 2-4 weeks.
- (2) **How to handle the intention of participation of NFCs in projects of data requesters.** The Task Force moved to maintain the current procedure: ICP Forests partners express their interest in joining projects within the data request approval period, and data applicants will be informed about this interest together with the data access. The Task Force also approved the right of ICP Forests partners to express their interest in joining projects even after the end of the data request approval period.
- (3) **How to handle commercial data requests given in data request form.** The Task Force approved that NFCs have to give their active written consent to commercial data requests and that the NFCs' response time to such requests will be increased to 4 weeks. If necessary, the conditions for the use of data need to be individually defined between the data owners and the commercial partner. The general position towards commercial usage

of ICP Forests data will be further discussed at the next meeting of the Programme Co-ordinating Group in Autumn 2021.

#### Item 4 Reports by the ICP Forests Expert Panels and Committees on activities and progress since the 36th TFM

##### 11 EP Ambient Air Quality (Chair: Ms Diana Pitar, Co-Chair Ms Elena Gottardini)

Ms Pitar presented issues discussed at their last EP meeting with 31 participants from 18 countries. These included (a) how to keep up with minimum quality control activities, (b) a future passive samplers inter-calibration event, (c) a focus on other N-related gases (NO<sub>2</sub>, NH<sub>3</sub>), (d) an update of the pictures of the online photo exercise, and (e) preparatory work for the Ecological Studies book. She listed five major publications<sup>4</sup> from members of the EP AAQ. An online photo exercise is planned for August and September 2021, as is the resubmission / correction of the database by the countries. The countries did not report any specific problems regarding the air quality monitoring and visible injury assessment for 2020-2021.

##### 12 EP Biodiversity and Ground Vegetation (Chair: Roberto Canullo, Co-Chair: Jean-Luc Dupouey)

Mr Canullo reported on the latest activities of the EP which included the screening of data and discussion of several issues with clarifications ongoing. He will send questions to the EP members according to the schedule for analysing the quality and completeness of the database for the Ecological Studies book.

##### 13 EP Crown Condition and Damage Causes (Chair: Nenad Potočić, Co-Chair: Volkmar Timmermann)

Mr Potočić shared the main outcomes of their last EP meeting: (a) the participation of countries in the international field/photo ICCs will be included in the Crown chapter of the annual Technical Report; (b) mandatory quality information in the Level I crown survey will be submitted together with TRE and TRF files; (c) new tree species/genera were added to species list; (d) Annex 3 and the Dictionary were updated (scientific names and details on fungi and insects); (e) parts of the Manual were slightly updated. He highlighted two publications dealing with tree mortality and with the relationship between defoliation and growth<sup>5</sup>. National calibration courses and regular assessments of most countries were not affected by the COVID-19 pandemic but there will be no international field ICC this year. The Photo ICC 2021 is in progress with 23 countries participating as is the preparatory work for the Ecological Studies book. Two publications are planned for 2021 on tree mortality and on European ash. The deadline for submission to a special issue in the journal *Plant and Soil Advances in Forest Ecophysiology: Stress Response and Ecophysiological Indicators of Tree Vitality* is 16 January 2022.

##### 14 EP Deposition (Chair: Arne Verstraeten, Co-Chairs: Peter Waldner, Daniel Žlindra)

Mr Verstraeten reported on the status of data resubmissions, including the thorough screening of the database, the preparation of a list of data issues per country, and the compilation of guidelines for resubmission. Data resubmissions will start this summer and should be finished by 15 February 2022. A workshop for the EP will be organised on the preparation of the Ecological Studies book deposition chapter on 17 June 2021. The next EP meeting will be held in March 2022. He listed 11 publications and highlighted the one by Braun et al. (2020)<sup>6</sup>

15 Mr Verstraeten reported that countries had problems with deposition sampling and/or analysis due to the COVID-19 pandemic. This resulted in some data gaps in certain countries which need to be gap filled. An extension of the Manual for the measurement of mercury (Hg) is prepared by Frauke Geppert (Thünen Institute of Forest Ecosystems, Germany). It is based on the results of a test project with a special low-cost bulk sampler in Saxony, Germany. Two

<sup>4</sup> Agathokleous et al. 2020, [10.1126/sciadv.abc1176](https://doi.org/10.1126/sciadv.abc1176), Eghdami et al. 2020, [10.3390/atmos11111261](https://doi.org/10.3390/atmos11111261), Etzold et al. 2020, [10.1016/j.foreco.2019.117762](https://doi.org/10.1016/j.foreco.2019.117762), Hůnová et al. 2020, [10.1016/j.scitotenv.2020.141038](https://doi.org/10.1016/j.scitotenv.2020.141038), Sicard et al. 2020, [10.1007/s11676-020-01191-x](https://doi.org/10.1007/s11676-020-01191-x)

<sup>5</sup> Brandl et al. 2020, [10.1016/j.foreco.2019.117652](https://doi.org/10.1016/j.foreco.2019.117652); Ferretti et al. 2021, [10.1016/j.ecolind.2021.107749](https://doi.org/10.1016/j.ecolind.2021.107749)

<sup>6</sup> Braun et al. 2020, [10.3389/ffgc.2020.00033](https://doi.org/10.3389/ffgc.2020.00033)

publications by EP members are planned on nitrate leaching in Swiss forests (lead author: Peter Waldner) and responses of forest ecosystems to decreasing nitrogen deposition in Europe (lead author: Andreas Schmitz).

16 **EP Foliage and Litterfall** (Chair: Pasi Rautio, Co-Chair: Liisa Ukonmaanaho)

Mr Rautio reported on the status of foliage and litterfall sampling and on data corrections in the database; correction lists will be sent to the countries soon. At their last EP meeting, videos about how to collect foliage/litterfall in the field were proposed; Switzerland already published one. Mr Rautio highlighted three publications<sup>7</sup> and introduced seven new projects/approved proposals. Field work was not affected by the COVID-19 pandemic but pre-treatments and sample analyses were delayed in some countries due to staff restrictions and tight budgets.

17 **EP Forest Growth** (Chair: Tom Levanič, Co-Chair: Tanja Sanders)

Mr Levanič informed that the 2019/20 periodic growth inventory had finished and results will be reported by February 2022. At the last EP meeting, topics discussed included data corrections in the database, the implementation of Manual changes, the plot and sample design in early successional stages with high stand densities, and the increase in the availability of dendrometer data and their potential requirement on Level II plots. There is an extra meeting planned on plot and sample design in young stands, but not before autumn. Natural disasters played a larger role than the COVID-19 pandemic on Level II growth inventories.

18 Mr Levanič highlighted six major publications<sup>8</sup> and six data requests in 2021. The EP continues to prepare the data for the Ecological Studies book, including cross-checking of the database for errors, the calculation of volumes for various species to establish ecograms with mean growing potential for the main tree species, and tests using girth bands to calculate climate growth correlations and to extend tree-ring measurements.

19 **EP Meteorology, Phenology, and LAI** (Chair: Stephan Raspe, Co-Chair: Stefan Fleck)

Mr Fleck reported on their last EP meeting with 46 participants from 20 countries. During the EP meeting, the wind data submission had been clarified and in preparation of the Ecological Studies book, it had been decided that evaluations should be done for both measured and modelled meteo data, quality control and gap filling will be based on the NitLeach II project, and the water budget modelling will use LWF-Brook 90. Further interested EP members are always welcome to join the group of authors. He encouraged all countries to take part in an online survey which already provided many helpful reactions but also problems concerning data resubmission.

20 Mr Fleck informed about newly incorporated methods to one stand in the Solling region for measuring LAI in inhomogeneous stands and announced a central evaluation of hemispherical photographs from 2021/2022 LAI measurements. Older hemispherical pictures can also be uploaded and will be re-evaluated.

21 **EP Soil and Soil Solution** (Chair: Bruno De Vos, Co-Chairs: Nathalie Cools, Tiina M. Nieminen)

Mr De Vos informed the TF about the rejection of the H2020 FORSoils proposal. A meeting with the winning HoliSoils proposal leaders from LUKE, the PCC, the Forest Soil Co-ordinating Centre (FSCC), and the EP Soil and Soil Solution chairs was held to discuss possible co-operation and synergies. The HoliSoil consortium will submit an official data request (soil, growth, biodiversity) to ICP Forests.

22 The EP Soil and Soil Solution plans to establish a working group on the possibilities for nesting ICP Forests Level I soil monitoring plots into the LUCAS network (used by EUROSTAT) as permanent plots as the ICP Forests soil analysing methods (see the ICP Forests Manual) are much better suited for forest soils. Although LUCAS is based on a 2 km x 2 km grid, only a subset of plots is selected each year. Participation in the new group is highly welcome.

---

<sup>7</sup> Etzold et al. 2020, [10.1016/j.foreco.2019.117762](https://doi.org/10.1016/j.foreco.2019.117762); Penuelas et al. 2020, [10.1038/s42003-020-0839-y](https://doi.org/10.1038/s42003-020-0839-y); Nussbaumer et al. 2020, [10.1038/s41598-020-62073-0](https://doi.org/10.1038/s41598-020-62073-0)

<sup>8</sup> Bose et al. 2021, [10.1016/j.scitotenv.2021.147222](https://doi.org/10.1016/j.scitotenv.2021.147222); Yang et al. 2021, [10.1016/j.foreco.2021.118947](https://doi.org/10.1016/j.foreco.2021.118947); Rohner et al. 2021, [10.1016/j.ecolind.2020.106903](https://doi.org/10.1016/j.ecolind.2020.106903); Ciceu et al. 2020, [10.1016/j.scitotenv.2019.134129](https://doi.org/10.1016/j.scitotenv.2019.134129); Etzold et al. 2020, [10.1016/j.foreco.2019.117762](https://doi.org/10.1016/j.foreco.2019.117762); Reyser et al. 2020, [10.5194/essd-12-1295-2020](https://doi.org/10.5194/essd-12-1295-2020)

23 Regarding data quality indicators in soil and soil solution surveys, the EP Soil and Solution proposed to (a) *not* increase the frequency of organising soil ring tests as they are linked to the soil surveys every 10 years; (b) make ring test samples that are stored at FSCC and countries available for requalification, and (c) report national central lab data from BioSoil (analysed by INRA) to the ICP Forests database if not yet submitted by countries. The EP collected ideas on data quality indicators in the field which will be communicated to the ICP Forests Quality Assurance Committee.

24 For the preparation of the Ecological Studies book, the soil data needs to be improved by the soil experts, including gap filling, submission of data still residing in national databases, and reanalyses of archived soil samples, if data is missing. Mr De Vos highlighted five publications<sup>9</sup>. An ICP Forests Brief is planned on heavy metals in forest soils. The COVID-19 pandemic had only limited impact on field and lab work. Planned activities include (a) the maintenance and further development of the monitoring infrastructure, (b) the status and trends of heavy metals in forest ecosystems, (c) the carbon sequestration potential of forests under the impact of air pollution and climate change. Experts are welcome to join in the preparation of respective publications.

25 **Working Group on QA/QC in Laboratories** (Chair: Alfred Fürst, Co-Chair: Anna Kowalska)

Mr Fürst informed about the progress of the 24<sup>th</sup> Needle/Leaf Interlaboratory Comparison Test 2021/2022<sup>10</sup>, currently including 39 participants. The deadline for registration is 25 June 2021. Mr Michael Tatzber from the Austrian Research Centre for Forests BFW succeeded Mr Fürst as co-ordinator of these ringtests. The 10<sup>th</sup> Soil Interlaboratory Test 2021<sup>11</sup> co-ordinated by Ms Tamara Jakovljević from the Croatian Forest Research Institute is already underway, with 31 participants having sent samples. The 11<sup>th</sup> Atmospheric Deposition/Soil Solution Working Ringtest<sup>12</sup> co-ordinated by Anna Kowalska from the Forest Research Institute in Poland was postponed to 2021/22. The registration deadline is the end of September 2021. The 8<sup>th</sup> Meeting of the Heads of the Laboratories was postponed to May 2022 at WSL in Birmensdorf, Switzerland. Mr Fürst will start to regularly inform the NFCs at the end of each year about activities of the WG QA/QC in labs (e.g. ongoing ringtests and planned meetings). Detailed information on meetings and ringtests is also available on the ICP Forests website<sup>15</sup>.

26 **Quality Assurance Committee** (Chair: Manuel Nicolas)

Mr Nicolas reported on the committee's activities and progress since its re-establishment the year before. He thanked the EPs for their valuable support in revising Manual Part III. Upcoming tasks include the support (a) of EPs updating QA/QC activities in their Manual parts and in the organisation of internal exercises and in the regular evaluation of quality objectives and indicators, and (b) of the PCC in setting up a new reporting system in the ICP Forests database for quality in the field and defining a practical framework for reporting the overall quality of the programme, e.g. in the annual Technical Report.

27 The Task Force approved the renewal of the Mandate given to Mr Nicolas and the QAC at the previous TFM; Mr Nicolas will prepare a time schedule for the new mandate.

28 **Scientific Committee** (Chair: Marcus Schaub, Co-Chair: Lars Vesterdal)

Mr Schaub reported on the achievements during the last year, e.g., a new name and logo were successfully established for the ICP Forests Scientific Conferences: FORECOMON – Forest Ecosystem Monitoring Conference. The SciCom had reviewed the new summaries by EP Chairs of non-ICP Forests studies on air pollution effects on forests that the PCC uses for their WGE reporting.

---

<sup>9</sup> Bommarez et al. 2021, [10.21436/inbor.29316481](https://doi.org/10.21436/inbor.29316481); Braun et al. 2020a, [10.3389/ffgc.2020.00033](https://doi.org/10.3389/ffgc.2020.00033); Braun et al. 2020b, [10.1371/journal.pone.0227530](https://doi.org/10.1371/journal.pone.0227530); Cechini et al. 2021, [10.1016/j.catena.2019.104102](https://doi.org/10.1016/j.catena.2019.104102); Cecchini et al. 2019, [10.1016/j.catena.2021.105175](https://doi.org/10.1016/j.catena.2021.105175)

<sup>10</sup> <http://icp-forests.net/group/qualityinlaboratories/page/foilage-and-litterfall-ringtest-and-qa-qc-information>

<sup>11</sup> <http://icp-forests.net/group/qualityinlaboratories/page/soil-ringtest-and-qa-qc-information>

<sup>12</sup> <http://icp-forests.net/group/qualityinlaboratories/page/deposition-and-soil-solution-ringtest-and-qa-qc-information>

<sup>15</sup> <http://icp-forests.net/group/qualityinlaboratories>

29 Mr Schaub informed about the international collaboration with the H2020 eLTER Preparatory Phase Project (eLTER PPP) and H2020 eLTER PLUS and about the rejection of the H2020 ForSoils Action proposal. For an overview of ICP Forests plots in LTER, please visit the LTER portal DEIMS<sup>14</sup>. Although there are quite a lot of plots already in LTER, plots on the ESFRI Roadmap have to be specifically selected by the countries, which will happen during the next 1-2 years. The Swiss long-term monitoring plots, for example, are already included. Mr Schaub will prepare an overview by the next PCG meeting this autumn.

30 Three special issues initiated by members of the ICP Forests community are still inviting manuscripts: *Forest monitoring to assess forest functioning under air pollution* in *Frontiers*, deadline: 15 July 2021; *Forest Soil Monitoring in Applied Sciences*, deadline 2 July 2021; *Advances in Forest Ecophysiology: Stress response and ecophysiological indicators of tree vitality* in *Plants*, deadline 16 January 2022. He showed the results of an online questionnaire from the FORECOMON 2021 ICP Forests Scientific Conference, indicating that around 40% of the responding participants were from outside the ICP Forests community.

## Item 5 Reports by the Working Group on Effects (WGE) and Sister ICPs under the Convention

31 Ms Isaura Rábago, Chair of the **Working Group on Effects**<sup>15</sup> under the UNECE Air Convention, provided an update on current WGE and Convention issues. She listed the major topics addressed at the last WGE/Convention meetings (6<sup>th</sup> Joint Session of the EMEP Steering Body and the Working Group on Effects<sup>16</sup>, 14-17 Sept 2020; the 40<sup>th</sup> Meeting of the Executive Body (EB) of the Convention<sup>17</sup>, 18 Dec 2020; and the Joint EMEP/WGE Extended Bureaux Meeting, 1-4 Mar 2021<sup>18</sup>), including the Workplan 2020-2021, the progress of ICPs/TFs, the review of the Gothenburg protocol, the Science Strategy, and financial issues, and showed the expected contributions by ICP Forests to the Gothenburg Protocol review report within the next two years. All presentations and documents from these meetings are available from the Air Convention website<sup>19</sup>. An MoU/MoC between LTER-Europe and the WGE is under development; it will be discussed and adopted at a Joint EMEP/WGE Session. To become more visible to policy makers and the general public, the WGE develops a webpage which links to the individual ICP/TF. On behalf of the Executive Body Bureau, she thanked the ICP Forests community for their efforts and continuous activities during the difficult times of the COVID-19 pandemic.

32 During the discussion, it was clarified that the PCC will provide a concise overview of ICP Forests' achievements directly to the WGE for the Gothenburg Protocol review report based on ICP Forests reports and publications within the following two weeks. The PCC will distribute drafts of the more comprehensive, informal new fact sheets among the TF for approval in time before the 7<sup>th</sup> Joint EMEP/WGE Session in September.

33 Ms Heleen de Wit, Chair of **ICP Waters**<sup>20</sup>, gave an overview of the ICP Waters, which regularly assesses trends in water chemistry and recovery, and of biological trends (macro-invertebrates) in relation to sulphur and nitrogen deposition in ca. 500 lakes and streams in Europe and North America, while also investigating climate and land use effects. The 2020-2021 Nitrogen Report is still in the making and includes trends and spatial patterns, as well as biological responses to nitrogen (N). They found a significant decline in N deposition at nearly all of the investigated ca. 500 sites, while nitrate in surface waters decreased only in around half of them. Their Workplan 2022-2023 includes a

<sup>14</sup> [https://deims.org/search/sites?field\\_projects\\_target\\_id%5B%5D=3002&field\\_projects\\_target\\_id%5B%5D=3003](https://deims.org/search/sites?field_projects_target_id%5B%5D=3002&field_projects_target_id%5B%5D=3003)

<sup>15</sup> <http://www.unece-wge.org/>

<sup>16</sup> <https://unece.org/info/events/event/20045>

<sup>17</sup> <https://unece.org/info/events/event/350034>

<sup>18</sup> <https://unece.org/info/events/event/352408>

<sup>19</sup> <https://unece.org/info/events/unece-meetings-and-events>

<sup>20</sup> <http://www.icp-waters.no/>

2022 report on biological recovery and possibly another joint WGE report. The Task Force Meeting 2022 of ICP Waters together with ICP Integrated Monitoring will be held in Riga.

34 Ms Alice James Casas, Chair of the **ICP Modelling and Mapping**<sup>21</sup> (**ICP M&M**), described plans and progress of the ICP M&M, including the Centre of Dynamic Modelling (CDM). ICP M&M has started to publish a newsletter twice per year; the CDM launched a new website<sup>22</sup> and prepares a review of dynamic modelling work under the Convention.

35 Ms Christin Loran from the Co-ordination Centre for Effects (CCE) under the ICP M&M reported on the status of the European Background Database for Critical Loads by Wageningen Environmental Research, whose aim is to enable gap filling for countries that do not deliver CL data; the final report will be published soon. The review and revision of Empirical Critical Loads is ongoing and will be finalised by 2022. Their Workplan 2022/2023 also includes the harmonisation of a new receptor map for Europe, a workshop on critical levels of ammonia, and a report on modelling the impact of air pollution on biodiversity in 2030 and beyond.

36 Mr Ulf Grandin, Co-Chair of the **ICP Integrated Monitoring**<sup>23</sup>, gave an overview on recent activities of the ICP IM. The current ICP IM network includes 48 active catchment sites in 15 countries with a renewed interest from Canada. Planned scientific publications are on the impacts of internal catchment-related N parameters to TIN leaching, HM trends in concentrations and fluxes across ICP IM sites in Europe, and in co-operation with ICP Forests on the effect of N enrichment on forest bryophytes which shows a modest decrease in taxonomic and functional diversity. They also published a scientific paper on the lack of recovery in the epiphytic lichen community after S deposition reduction over a monitoring period of 20 years<sup>24</sup>, and currently work on mercury and other heavy metals. They added the ICP Forests method for epiphytic lichen monitoring to the ICP IM Manual, which has now five methods for this variable.

37 ICP IM launched their new “IM light” sites with a lower demand for monitoring variables with the aim to expand their network and include new countries and ecosystem sites (grasslands, heathland and shrub, coastal habitats, wetlands) as requested by the Air Convention/EU NEC Directive. The ICP IM database moved from SYKE Finland to SLU Sweden. After ca. 30 years, the Programme Centre is looking for a new host, which will probably also be SLU.

38 Ms Felicity Hayes, Chair of the **ICP Vegetation**<sup>25</sup>, reported on achievements of the ICP Vegetation in 2020 and their future work plan. Their TFM 2021 was held online, 22-24 Feb 2021, with 125 participants from 35 countries. Their TFM 2022 is planned to be in Kaunas, Lithuania. Recent activities include the addition of annexes to their Mapping Manual, with guidance on gap filling in files to enable flux-effect modelling and a document on interactions between ozone exposure and N application in crops. They have also been checking their parameterisations for (semi-)natural vegetation, and for upscaling to the whole canopy for large-scale modelling. They also developed a coupled stomatal conductance and photosynthesis model for which they will add new datasets from Europe and India.

39 Ms Hayes showed preliminary results and maps from several studies: (1) volume increment decreases with increasing ozone flux in trees; (2) models of the impacts of ozone on yield in sub-Saharan Africa predict a >20% estimated yield loss for some areas; (3) yield of several crops increases in a range of Asian countries by filtering the air. A recently published report<sup>26</sup> on the Moss survey 2015/16 shows a north-west to south-east gradient in Europe with high concentrations of heavy metals in mosses in the (south-)east partly due to anthropogenic sources and high wind-resuspension. Maps taken from the report show strong decreases of HM in mosses since 1990 for cadmium (-63%), lead (-82%), vanadium (-57%), and zinc (-23%), with hotspots particularly in the east and south. Nitrogen in mosses has not significantly declined in the investigated period 2005-2015; concentrations are lowest in northern/western Europe and

<sup>21</sup> [https://www.umweltbundesamt.de/en/Coordination\\_Centre\\_for\\_Effects](https://www.umweltbundesamt.de/en/Coordination_Centre_for_Effects)

<sup>22</sup> <http://wge-cdm.se>

<sup>23</sup> <https://www.syke.fi/nature/icpim>

<sup>24</sup> [10.1017/S0024282921000037](https://doi.org/10.1017/S0024282921000037)

<sup>25</sup> <https://icpvegetation.ceh.ac.uk/>

<sup>26</sup> <https://icpvegetation.ceh.ac.uk/biblio>

highest in central Europe. The Moss survey 2020-2022 is under way, which will also include a pilot study on mosses as biomonitors of microplastics as indication of atmospheric deposition rates. She invited the ICP Forests members to join a workshop on the latest developments in the analysis of environmental microplastics.

40 During the discussion, it was agreed that a future collaboration and data exchange to compare the results from the surveys of heavy metals in soils and mosses would be highly desirable. Ms Hayes and Mr De Vos will stay in contact.

#### **Item 6 Revision of the ICP Forests Manual Part III - Quality Assurance**

41 Ms Anne-Katrin Prescher presented the process of the **revision of Manual Part III** which provides a Quality Assurance Toolkit for the ICP Forests programme. Consequently, QA/QC procedures will need to be defined and tested by each EP and included in their respective Manual part during the next 2025 Manual revision. Response actions and respective responsibilities are defined for each ICP Forests body; reasons for flagging data in the database and reports are given. EPs should evaluate and report regularly about the fulfilment of main quality indicators defined for their survey. NFCs are requested to confirm the implementation of a minimum preparation effort of each survey during data submission to the ICP Forests database. The Task Force approved Part III of the Manual after changing the text to explicitly state the support of the NFCs and EPs by the PCC.

#### **Item 7 The ICP Forests database: Status and Future Work**

42 Mr Till Kirchner, Data Manager at the PCC, informed the TF that the Manual revisions adopted in 2020 and changes to the database needed for data resubmission for the Ecological Studies book are still not completely implemented. Also, the harmonisation of data structures over time and the correction of mistakes in the data structure continues. A new data structure enables the combination of information from labs and ringtest results with monitoring data. A new user guide for the data portal<sup>27</sup> was developed in addition to the online documentation<sup>28</sup>. It will be revised continuously and feedback is always welcome.

43 During the discussion, it was clarified that e.g. calculated tree height and volume data from the EP Forest Growth can be added centrally to the database in future. It is suggested that all EP chairs revise the new user guide. Mr Kirchner will provide an overview of the status of data structure harmonisations. The overall goal is to enable data submission from all years in one unique form for all surveys.

#### **Item 8 Status of the Ecological Studies Book and Call for Re-submissions**

44 Mr Schwärzel described the progress of the preparation of an Ecological Studies book on the status, changes, and trends in long-term monitoring under ICP Forests. The main outcome of the book will be e.g. consistent long-term time series for all surveys, a synthesis of the data of different surveys, and an improved methodology for data gap filling and harmonisation. He sees the book as an opportunity for improving the database in terms of data quality and completion, maximising data use, and increasing the visibility of the programme.

45 Mr Schwärzel presented results from face-to-face meetings with the EP chairs on data availability and data needs, and from a joint meeting of all lead authors: (a) a minimum period of 20 years for most surveys was defined; (b) data will be classified into groups: tree species and broadleaves/conifers, biogeographic region, Ecocluster; and (c) in addition to temporal trends, temporal-spatial trends on Level II plots will be analysed for specific events (e.g., 2003, 2018 summer heats/droughts). He presented the timetable (see below) for database improvement, and asked the countries for active support upon request in the review of survey-specific data availability, quality and completeness summaries; and with the application of the Ecocluster approach (for surveys dealing with cycles of water and matter) by

---

<sup>27</sup> [https://www.icp-forests.org/pdf/icpf\\_data\\_portal\\_user\\_guide.pdf](https://www.icp-forests.org/pdf/icpf_data_portal_user_guide.pdf)

<sup>28</sup> <https://icp-forests.org/documentation>

providing/reviewing information on the European Forest Type (EFT) Classification and World Reference Soil Group (WRSG).

Done by	Responsibility and Action
16 July 2021	<u>NFCs</u> check the survey specific data availability summaries provided by the PCC and send the corresponding report form back to the PCC
20 Sep 2021	<u>PCC and EP chairs</u> : one-on-one meetings to discuss data gap and data quality issues of each survey
31 Oct 2021	<u>NFCs</u> check the survey specific data quality and completeness summaries provided by the PCC/EP chairs and send the corresponding report form back to the PCC
PCG 2021	Database is harmonised/optimised and data portal updated
15 Feb 2022	<u>Member states</u> resubmit data to correct identified gaps and quality problems
Before JEPM 2022	<u>EP Chairs</u> review the available data and, if necessary, requesting further corrections/resubmissions by the Member States
At the JEPM 2022	Available data base and work in progress is discussed/presented by the <u>PCG</u>
At the TFM 2022	<u>PCG</u> presents the results of the resubmission/analysis

46 During the discussion, it was clarified that the suggested groupings, e.g. by biogeographic region, still need to be tested with the available data and that the impact of highly polluted areas vs. remote areas on the results will also be considered. This will be further discussed in the respective Expert Panels.

## Item 9 Recent and Future Initiatives and Co-operation with other Convention Bodies and with International Organisations

47 Mr Ferretti informed the TF about open and upcoming calls for project proposals: (1) EFI Call, EFI Network Fund, Towards a harmonised European forest monitoring system. WSL, Thünen, CFRI joined a proposal led by NIBIO on short notice but have not received a response<sup>29</sup>. (2) HORIZON-CL5-2021-D1-01-09: The contribution of forest management to climate action: pathways, trade-offs and co-benefits. (3) Future call: HORIZON-CL6-2022-CLIMATE-01-05: Forestry – European observatory of climate change impacts and demonstration network of climate smart restoration pilots. He reminded the TF that ICP Forests is not a legal entity and cannot formally join a consortium. No institute or person is entitled to represent ICP Forests unless an explicit mandate is given by the TF. On an individual basis, however, members of the ICP Forests community are kindly asked to ensure the programme’s interests are considered in the frame of proposals. They are – of course – free to develop a proposal of their own.

48 In one call ICP Forests is explicitly mentioned: “Re-initiate EU participation in the International Co-operative Programme on the Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) for long-term observations of forest ecosystems”. During the discussion, it was decided that a concerted action will be discussed as soon as the full text of the proposal is available, with the aim to invite the European Commission to become a more active player in the programme again.

49 Mr Giancarlo Papitto (NFC Italy) informed the TF about a new EU LIFE project connected to the EU NEC Directive and the proposal of a new monitoring site in Italy.

50 Mr Hiroyuki Sase (Network Center for the EANET<sup>30</sup> at the Asia Center for Air Pollution Research ACAP) reported on the progress of the **Acid Deposition Monitoring Network in East Asia (EANET)** and its ecosystem monitoring. EANET is a regional co-operation of 13 countries from NE to SE Asia which started in 2001. Current activities include discussions on the expansion of the network’s scope from “acid deposition” to “air pollution”, a new funding mechanism, and the preparation of the 4<sup>th</sup> Periodic Report on the State of Acid Deposition (PRSAD4), which will be published by the end of the year. He informed the TF about the publication of a scientific paper on the response of forest catchments to reduction

<sup>29</sup> In the meantime, the co-ordinator has been informed that the proposal was not granted.

<sup>30</sup> <https://www.eanet.asia/>

in air pollution in Japan<sup>31</sup> and a review on air pollution monitoring and tree decline in the EANET countries<sup>32</sup>. Manuscripts on the accumulation of atmospheric sulphur in forest soils, N saturation in central Japan, and a regional assessment using the critical loads approach in the EANET region are in preparation. The 10<sup>th</sup> International Conference on Acid Deposition ACID RAIN 2020 will be held in Niigata, Japan, 18-21 April 2023.

51 Mr Schwärzel informed the TF about the suspension of the development of a **Memorandum of Co-operation (MoC) between LTER and ICP Forests** until the MoC between LTER and the WGE is finalised.

#### Item 10 AOB

52 On behalf of the Natural Resources Institute Finland LUKE, Ms Päivi Merilä invited the Task Force to the 10<sup>th</sup> Scientific Conference of ICP Forests FORECOMON 2022 and 38<sup>th</sup> Task Force Meeting in Helsinki, Finland, 30 May – 3 June 2022. The Task Force thanked Finland for the kind invitation.

53 On behalf of the Task Force, Mr Ferretti thanked everyone contributing to the successful 37<sup>th</sup> Task Force Meeting and FORECOMON 2021, especially Mr Peter Waldner, Mr Marcus Schaub, and Ms Sabine Augustin. He thanked all the WSL staff involved. He also thanked the WGE and sister ICPs for their participation, the NFCs for their enduring efforts to keep the monitoring system operational, and the EPs for their expertise, work, and organisation of meetings, all despite the difficult situation due to the COVID-19 pandemic.

---

<sup>31</sup> <https://doi.org/10.1016/j.atmosenv.2021.118223>

<sup>32</sup> <https://doi.org/10.1016/j.scitotenv.2020.140288>

## ANNEX I – List of Participants

No	Name	First name	Organisation	Country
1	Apuhtin	Vladislav	Estonian Environment Agency	Estonia
2	Augustin	Sabine	Federal Office for the Environment FOEN	Switzerland
3	Badea	Ovidiu	National Institute for Research and Development in Forestry	Romania
4	Beez	Juliane	Federal Ministry of Food and Agriculture	Germany
5	Benham	Sue	Forest Research	United Kingdom
6	Camba	Vladimir	Bundesministerium für Landwirtschaft, Regionen und Tourismus	Austria
7	Canullo	Roberto	Camerino University	Italy
8	Češljarić	Goran	Institute of Forestry, Belgrade	Serbia
9	Cools	Nathalie	INBO	Belgium
10	De Vos	Bruno	Research Institute for Nature and Forest (INBO)	Belgium
11	de Wit	Heleen A	ICP Waters - Norwegian Institute for Water Research	Norway
12	Đorđević	Ilija	Institute of Forestry	Serbia
13	Ferretti	Marco	Swiss Federal Research Institute WSL	Switzerland
14	Fleck	Stefan	Nordwestdeutsche Forstliche Versuchsanstalt NW-FVA	Germany
15	Fürst	Alfred	Bundesforschungszentrum für Wald	Austria
16	Gottardini	Elena	Research and Innovation Centre	Italy
17	Grandin	Ulf	ICP IM - Swedish University of Agricultural Sciences	Sweden
18	Haggenmüller	Katrin	Thünen Institute of Forest Ecosystems	Germany
19	Hayes	Felicity	ICP Vegetation (UKCEH)	United Kingdom
20	Hilgers	Catherine	Thünen Institute of Forest Ecosystems	Germany
21	Ingerslev	Morten	University of Copenhagen	Denmark
22	James Casas	Alice	ICP Modelling & Mapping - INERIS	France
23	Kirchner	Till	Thünen Institute of Forest Ecosystems	Germany
24	Kowalska	Anna	Forest Research Institute	Poland
25	Kulbokas	Gintaras	Lithuanian State Forest Service	Lithuania
26	Leca	Stefan	National Institute for Research and Development in Forestry	Romania
27	Lech	Paweł	Forest Research Institute	Poland
28	Levanic	Tom	Slovenian Forestry Institute	Slovenia
29	Loran	Christin	Umweltbundesamt	Germany
30	Merilä	Päivi	Natural Resources Institute Finland	Finland
31	Michel	Alexa	Thünen Institute of Forest Ecosystems	Germany
32	Michopoulos	Panagiotis	Hellenic Agricultural Organization "DEMETER"	Greece
33	Nicolas	Manuel	Office national des forêts	France
34	Nieminen	Tiina M.	Natural Resources Institute Luke	Finland
35	Olejnik	Marcin K.	Ministry of Climate and Environment	Poland
36	Öztürk	Sitki	Republic of Turkey - General Directorate of Forestry	Turkey
37	Papitto	Giancarlo	Office for studies and projects - Carabinieri Corps	Italy
38	Pavlena	Pavel	NLC	Slovakia
39	Pitar	Diana	INCDS Marin Draceva	Romania
40	Popova	Genoveva	Executive Environment Agency	Bulgaria
41	Potočić	Nenad	Croatian Forest Research Institute	Croatia
42	Prescher	Anne-Katrin	Thünen Institute of Forest Ecosystems	Germany
43	Rábago	Isaura	WGE - CIEMAT	Spain
44	Raspe	Stephan	Bavarian State Institute of Forestry	Germany
45	Rautio	Pasi	Natural Resources Institute Finland	Finland
46	Sanders	Tanja	Thünen Institute of Forest Ecosystems	Germany
47	Sase	Hiroyuki	EANET - Asia Center for Air Pollution Research (ACAP)	Japan
48	Schaub	Marcus	Swiss Federal Research Institute WSL	Switzerland
49	Schwärzel	Kai	Thünen Institute of Forest Ecosystems	Germany
50	Šrámek	Vít	Forestry and Game Management Research Institute	Czechia
51	Stuller	Zoltán	National Land Centre - Forestry Department	Hungary
52	Timmermann	Volkmar	NIBIO	Norway
53	Ukonmaanaho	Liisa	Natural Resources Institute Finland LUKE	Finland
54	Verstraeten	Arne	Research Institute for Nature and Forest (INBO)	Belgium
55	Vesterdal	Lars	University of Copenhagen	Denmark
56	Waldner	Peter	Swiss Federal Research Institute WSL	Switzerland

---

No	Name	First name	Organisation	Country
57	Wulff	Sören	Swedish University of Agricultural Sciences	Sweden
58	Žlindra	Daniel	Slovenian Forestry Institute	Slovenia
59	Zubieta	Belen	MITERD-Spain	Spain
60	Zvirbulis	Uldis	Latvian State Forest Research Institute "Silava"	Latvia

---

## ANNEX II – Agenda of the 37<sup>th</sup> Task Force Meeting of ICP Forests

### 10 June 2021 (Thu)

---

08:30 – 09:00	<b>Registration</b>
09:00 – 09:15	<b>Openings</b> <ul style="list-style-type: none"><li>• Host, Representative of the Lead country, Chairman of the ICP Forests</li></ul>
09:15 – 09:20	<b>Item 1   Adoption of agenda/minutes</b> Adoption of the 37 <sup>th</sup> TFM agenda and of the 36 <sup>th</sup> TFM minutes
09:20 – 09:50	<b>Item 2   Report by the Programme Co-ordinating Centre (PCC) on activities and progress since the 36<sup>th</sup> TFM</b> <ul style="list-style-type: none"><li>• Draft for WGE Workplan 2022-2023</li><li>• Update of the Gothenburg Protocol Review process</li><li>• Update of the EMEP and WGE strategies with respect to the Long-term Strategy of the Convention</li><li>• Financial statement</li><li>• Reporting (*), TR, ICP Brief #5</li></ul>
09:50 – 10:05	<b>Item 3   Optimizing data requests (*)</b> Proposal for optimizing the response time to data requests
10:05 – 10:35	<b>Tea / coffee break</b>
10:35 – 12:35	<b>Item 4   Reports by the ICP Forests Expert Panels and Committees on activities and progress since the 36<sup>th</sup> TFM</b> <ul style="list-style-type: none"><li>• EP Ambient Air Quality</li><li>• EP Biodiversity and Ground Vegetation</li><li>• EP Crown Condition and Damage Causes</li><li>• EP Deposition</li><li>• EP Foliage and Litterfall</li><li>• EP Forest Growth</li><li>• EP Meteorology, Phenology and LAI</li><li>• EP Soil and Soil Solution</li><li>• Working Group on QA/QC in Labs</li><li>• Quality Assurance Committee</li><li>• Scientific Committee</li></ul>
12:35 – 14:00	<b>Lunch</b>
14:00 – 14:50	<b>Item 5   Reports by the Working Group on Effects (WGE) and sister ICPs under the Convention</b>
14:50 – 15:20	<b>Item 6   Revision of the ICP Forests Manual Part III - Quality assurance</b>

### 11 June 2021 (Fri)

---

09:00 – 09:20	<b>Item 7   The ICP Forests database - Status and future work</b>
09:20 – 10:00	<b>Item 8   Status of the Ecological Studies book &amp; call for re-submissions</b>
10:00 – 11:00	<b>Item 9   Recent and future initiatives and co-operation with other Convention bodies and with international organisations</b>
11:00 – 12:00	<b>Item 10   AOB</b>
12:00	<b>Closing of the 37<sup>th</sup> Task Force Meeting</b> <span style="float: right;">(*) Decision items</span>