Meeting of the ICP Forests
Programme Co-ordinating Group (PCG)

Berlin, Germany, 9–10 November 2021
Hybrid online and in-person meeting

Minutes

Opening

1 Mr Ferretti (Chair of ICP Forests) welcomed all participants attending the meeting online or in-person in Berlin. He chaired the meeting on Day 1, Mr Schwärzel (Head of PCC) on Day 2.

2 The latest version of the agenda was distributed to everyone and adopted.

Welcome note

3 Ms Beez, lead country representative from the Federal Ministry of Food and Agriculture (BMEL) in Germany, welcomed everyone to the PCG meeting and shortly introduced herself. She wished the PCG a successful meeting and thanked everyone for their commitment to the ICP Forests network.

PART 1 – REPORTING

Report of the PCC

4 Mr Schwärzel gave a short overview on the latest activities of the PCC.

(a) Contributions to the review of the **Gothenburg Protocol** (fact sheets on ozone and N) were shared with the Task Force (TF). Final versions are due in spring 2022 and will be shared with the TF again before submission. All presentations and meeting documents from the **7th Joint Session of the EMEP Steering Body and Working Group on Effects** in Sept. 2021 are available on the Air Convention website[1].

(b) He introduced the **new PCC staff**:

   (i) Ms Andrea Schmidt, project secretariat, part-time, permanent;
   (ii) Ms Katrin Haggenmüller, database manager, part-time, permanent;
   (iii) Ms Catherine Hilgers, data scientist, full-time, 3 years; and
   (iv) the PCC is still searching for another data scientist for the preparation of the Ecological Studies book and a new web application programmer.

(c) Mr Schwärzel reported on the activities of the PCC at EU level. He attended a **member states workshop under the NECD** on parameters and protocols in June 2021 and another on site selection and reporting templates in October 2022 as an observer. He will contact the Commission again and further advertise the advantages of developing an interface with the ICP Forests DB, so that participating countries can download data directly in the requested

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[1] https://unece.org/info/Environmental-Policy/Air-Pollution/events/350954

format and send it to the Commission to fulfil their reporting obligations under the NEC Directive.

(d) Mr Schwärzel attended a Scientific Seminar at the **EFI Annual Conference** titled "Toward next generation forest monitoring: recent developments and policy needs"[2] where ICP Forests was not mentioned despite its valuable experience in long-term monitoring over the last 35 years. Because ICP Forests is part of the Air Convention, its activities may be overlooked by the forest community. The seminar concentrated on remote sensing, but ground-truthing is still seen as important. Mr Schwärzel highly recommended more awareness-raising at EU level. Mr Ferretti authored a **new opinion paper**[3] accepted to Annals of Forest Science. It describes the renewed interest in forest monitoring in Europe and advocates the value of ICP Forests in future forest monitoring.

(e) Mr Schwärzel met with the **Forest Europe Liaison Unit in Bonn (LUBo)** headed by the former chair of ICP Forests Mr Thomas Haußmann. Mr Schwärzel and Mr Ferretti will meet again with LUBo in December to discuss details of a cooperation and participation in LUBo's 2nd Forest Europe Webinar on 21 March 2022. Mr Schwärzel will share results from this meeting with the PCG.

Report from the EPs and committees

5   All EPs/WGs were asked to give a short presentation on the most important publications in 2021 and their planned outcomes in 2022.

6   Mr Potočić (Chair of **EP Crown Condition and Damage Causes**) highlighted the publication "Tree canopy defoliation can reveal growth decline in mid-latitude temperate forests" by Ferretti et al. (2021). The Photo ICC 2021 is still ongoing; results will be reported in 2022. The number of participants has never been higher than this year. Work is underway for the Ecological Studies book (ESB). Two publications are in preparation or have been recently submitted. The call for submissions to a special issue in "Plants" (MDPI) is still open.

7   Mr Levanič (Chair of **EP Forest Growth**) reported on the finalization of the 2019/20 periodic growth inventory. Data will be submitted as soon as the data portal is open again for data submission. Some countries have updated their equipment for taking growth measurements. He showed a list of publications and projects from 2020 and 2021 in their field. Work for the ESB is underway; he had met with Ms Hilgers (PCC) online to discuss data gap-filling. How to measure growth in young stands below 5 cm DBH will be discussed at the next EPM in April 2022.

8   Ms Pitar (Chair of **EP Ambient Air Quality**) presented results from the last online photo exercise for ozone-induced foliar symptoms on woody species, in which eight countries had participated. Almost 86% of operators met the quality objective limit. She highlighted six publications in their field. Future activities will include the preparation of the next EPM in April 2022, data corrections and resubmissions, organizing data from past ICCs and photo exercises, preparing a chapter on the results from VibEuroNet for the ICP Forests Technical Report, and starting to prepare the 2022 online photo exercise on ozone symptoms.

9   Mr Canullo (Chair of **EP Biodiversity and Ground Vegetation**) presented the outcomes of the last EPM with 36 participants from 23 countries, highlighted results from publications using Level I and Level II ground vegetation data, and presented recent ground vegetation surveys and planned activities in different countries. Several countries have included Level I / Level II plots to meet the needs of the NEC Directive, also considering plant diversity; the LIFE MODERn(NEC)

[2] https://efi.int/news/towards-next-generation-forest-monitoring-2021-10-12
[3] https://link.springer.com/article/10.1007/s13595-021-01112-w

project in Italy will test indicators from the Level II network, to be reported and discussed within ICP Forests.

10 Mr Verstraeten (Chair of **EP Deposition**) listed the most important ICP Forests publications, reports, conferences and proposals in 2021. He highlighted a publication by Marchetto et al. (2021) which compared measured atmospheric deposition (SO_4^{2-}, NO_3^- and NH_4^+) from EMEP-CCC and ICP Forests with modelled EMEP data. Results showed good agreement for open field deposition for sulphate and nitrate but not ammonia, likely due to the influence of local ammonia sources. A data resubmission workshop was held after the last TFM with country experts and PCC. Planned outcomes in 2022 include: 20th EPD meeting in April 2022 and a draft of a new deposition Manual section on the measurement and analysis of Hg. He expects that data resubmissions will be finalized by next year. A book chapter based on a paper by Mr Andreas Schmitz and the repetition of a leaching experiment using pollen are underway.

11 Mr De Vos (Chair of **EP Soil and Soil Solution**) highlighted two publications using ICP Forests plots, presented their main findings and listed three publications under development. This year's Technical Report includes a chapter on HM and an ICP Forests Brief is in preparation concentrating on Pb, Cd, and Hg, although there is only limited information available on the latter. The combined soil Level I data (S1) is finally integrated into the official PCC database. Mr De Vos described the procedure for providing a working data set to the HoliSoils H2020 project[4]. HoliSoils participants will give feedback on data inconsistencies and the ICP Forests Online Documentation. The S1 data will need to be approved by the Task Force at the next TFM 2022 for official publication and use in the Ecological Studies book. For the Level II soil data, resubmissions and validation are the most important tasks for 2022 to expand the Level II soil database for data analyses for the ESB.

12 During the discussion, Mr Kirchner reported that the issue on the partner code could be fixed. Partners can now download their Level I data to verify it.

13 Ms Ukonmaanaho (Co-Chair of **EP Foliage and Litterfall**) listed new publications in 2020-2021 of which two national reports were published together with ICP IM. She listed new projects and the status of the work on the ESB with data quality checks still being performed.

14 Mr Raspe (Chair of **EP Meteorology, Phenology and LAI**) listed the issues that were discussed and the decisions taken at the last EPM with regard to the preparation of the ESB. A working group was formed including Mr Waldner, Mr Schwärzel, Ms Prescher, Mr Fleck and Mr Raspe; further participation is still welcome. At their first meeting they will concentrate on water budget modelling. QC and gap filling started with the help of Ms Hilgers. Plans for the next year include the EPM on 4–8 April 2022 with the main topics QA, ESB, a new ICP Forests Brief on weather extremes, and a phenological training course. Mr Raspe highlighted two papers by Krüger et al. (2021) and Bose et al. (2021).

15 Mr Fleck (Co-Chair of **EP Meteorology, Phenology and LAI**) highlighted another two publications on phenology, listed issues and decisions taken at the last EPM in preparation of the ESB, and showed the next steps to be taken by the EP.

16 Mr Fürst (Chair of **WG QA/QC in laboratories**) reported on the results of the 23rd Needle/Leaf Interlaboratory Test; data submission for the 24th test ends on 2 Jan. 2022. The parameters in the requalification were lab-dependent. One lab failed the requalification in a lot of parameters and did not respond to any enquiries. The requalification of the 10th Soil Ringtest started. Mr Fürst listed the labs with problems, 11 labs had passed with all parameters immediately. For the 11th Atmospheric Deposition and Soil Solution Ringtest 39 labs had registered; results can be submitted by 28 Feb. 2022.

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[4] https://holisoils.eu/

17 The next Heads of the Labs meeting will be held 12-13 May 2022 at WSL in Birmensdorf as a face-to-face meeting; presentations are still welcome. Ms Kowalska will take over the position as Chair of the WG QA/QC; the position for Co-Chair is still open. Mr Michael Tatzber will take over Mr Fürst's FFCC tasks (e.g. Needle Leaf Interlaboratory Comparison Tests) from next year on.

18 Mr Nicolas (Chair of the **Quality Assurance Committee**) reported from the QAC meeting held that morning. After the adoption of the Manual Part III at the last TFM, the QA toolkit will have to be implemented by all surveys before the next Manual revision in 2025. This will include the definition of minimum requirements in survey preparation, the reporting of all mandatory activities into the DB, a regular evaluation of the main quality indicators, and the definition of response actions. The QAC had agreed on a draft mandate for 2021-25 for adoption at the next TFM. They also agreed on a time schedule to implement the QA/QC procedures into all Manual parts and to organize the evaluation and report of the DQ in the DB. The EP Chairs will review and complete a draft overview of DQ indicators compiled by Mr Nicolas. The next QAC meeting will provide ample time for discussing these.

19 Mr Schaub (Chair of the **Scientific Committee**) reported on the last FORECOMON 2021 with >200 participants on site and online and provided the URL for the conference's proceedings[5]. According to the participation in a live Mentimeter online poll, many young and external people from outside of ICP Forests had participated. He listed five manuscripts to be published and two in review for the Special Issue in Frontiers. He also reported on last year's Summer School FORMON[6] with 24 students from 10 countries.

20 Ms Ukonmaanaho informed about the planning for next year's **38th TFM and 10th FORECOMON** in Helsinki, 30.5.-3.6.2022. The conference will start on Monday at 13:00. The destination of the field excursion is not yet decided, Ms Ukonmaanaho still welcomes ideas. The venue is the Hotel Presidentii in Helsinki. They intend to hold a hybrid meeting. The tentative theme of the conference is "Forest dynamics in the Anthropocene", covering climate change effects, carbon, biodiversity, drought, damage, and synergies among international monitoring networks. The website will be hosted by the Thünen Institute and maintained by the PCC. A 1st Announcement is scheduled for Nov. 2021. The Scientific Committee will further discuss and decide on the conference theme, keynotes, and format of poster session. <u>They will distribute the minutes of their last meeting and invite the PCG to share ideas.</u>

Current and future reporting

21 Ms Michel gave an overview on recent and planned reporting activities by the PCC. She listed four ICP Forests Briefs and their preparation status and went over the editorial guidelines and current workflow for preparing a brief which includes the participation of EPs, NFCs, and Ministries, depending on the preparation stage. The 2021 Technical Report will be published online that week. She plans to follow the same structure for next year's report and to present it in more detail at the next TFM. She asked for feedback from EP chairs on the preparation of the TR "Recent findings and perspectives" chapter. Ms Michel listed the contributions of each EP to the last 12 TRs and asked whether a schedule for regular contributions should be introduced. She also presented a draft questionnaire to be sent to everyone leaving the programme to minimize the loss of expertise and asked for further ideas/experiences from the PCG.

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[5] https://doi.org/10.16904/envidat.225
[6] https://youtu.be/Wpx3Pt8UKt8

22 Discussion:

(a) Technical Report – New chapter "Recent findings and perspectives"

(i) The TR chapter "Recent findings and perspectives" asked EP Chairs to summarize approximately five publications which they considered the most relevant in their field. This chapter will be continued in the following TRs. It is very useful for the PCC in their reporting to the WGE.

(ii) It was proposed that in future highlighted scientific publications will be only selected if the following applies:

(1) peer-reviewed,
(2) from the reporting year or the year before if not yet included,
(3) more than one country is covered,
(4) emergent issues are covered,
(5) not necessarily from the ICP Forests network, and
(6) relevant to the UNECE Air Convention.

(iii) It was proposed that the restriction to five publications not be handled too strictly.

(iv) A more formal selection process for literature should be further specified, e.g. the journal's impact factor or the number of citations.

(v) It was suggested that the PCC harmonize the submissions to avoid repetition and provide structure, e.g. distinguish between drivers and responses.

(vi) The PCC will prepare guidelines for further discussion and share them with the PCG.

(b) Technical Report – Reports on individual surveys in ICP Forests

(i) Regular frequent contributions of scientific chapters to the TR from each EP may promote the value of ICP Forests data but also be difficult to implement.

(ii) Mr Schaub expressed his willingness to provide a chapter written by the Scientific Committee every year.

(iii) Mr Raspe agreed to provide an annual chapter on weather conditions of the respective reporting periods and on long-term trends, based preferably on data collected under ICP Forests.

(iv) Ms Hilgers offered her support to all EPs if they need R scripts to run evaluations every year for the TR.

(v) Contributions could be planned for 2-3 years in advance.

(vi) The PCC will draft a plan for future TRs for further discussion and share it with the PCG.

(c) Questionnaire for programme leavers

(i) The questionnaire's aims are to learn how to change, revise, improve the work/governance under ICP Forests. It will not request information on how to perform specific tasks.

(ii) The questionnaire could ask for main achievements of a person, to acknowledge their work.

(iii) The questionnaire will be distributed to all participants in ICP Forests who acted as an official ICP Forests delegate, and it will be on a voluntary basis.

(iv) The questionnaire would be sent to people leaving and having already left the programme.

(v) In future, the PCC should be informed of any changes in positions and should make sure that the information transfer is being done properly, possibly with a checklist.

(vi) PCC will prepare a draft questionnaire and ask the PCG for feedback and additional questions.

(d) ICP Forests Briefs

(i) There was no further progress on the ICP Forests Brief on drought effects. The authors have discussed including more EPs and expanding the title to include climate extremes. It will be removed from the list of expected briefs until there is further progress.

23 Mr Ferretti presented a **new proposal for a comprehensive assessment report in 2025** concentrating on the three domains: atmosphere, vegetation, and soil.

(a) Discussion:

(i) This report would be published in addition to the regular TRs and its content and message will not overlap with the ESB.

(ii) The aim is to be more comprehensive, include more integration, climate change research, linking of domains.

(iii) The structure should concentrate on domains, which will include processes.

(iv) The target audience is the Convention.

(v) The publisher could be the Thünen Institute. Including a review process will provide more credibility.

(vi) The PCG supports this initiative; Mr Ferretti will plan future steps and share them with the PCG.

Part 2. Strategic questions

Foster identification and solution of strategic questions for the programme

24 Mr Ferretti proposed a **new structure for future PCG meetings** to discuss important strategic questions and reduce the amount of reporting, which is covered in other meetings already.

25 Discussion:

(a) The reporting of EP Chairs during the PCGM is seen as important, but could be adapted to cover strategic questions of mutual interest instead of latest activities or relevant literature. Activity reports are already given at the TFM. The PCC needs to communicate very clearly what the EP Chairs are to report.

(b) A mid-term review or evaluation of the 2016–2023 Strategy of ICP Forests[7] at the next PCGM is proposed.

(c) PCGM are the only meetings when all EP Chairs come together. Not all EPs present at jEPMs. At PCGM a time slot could be reserved for discussing collaborations that could decide which EPs meet at a following jEPM. However, the Scientific Committee may be the better place to discuss scientific collaborations between EPs. It was suggested that the Scientific Committee could be expanded to include all EP Chairs.

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[7] https://www.icp-forests.org/pdf/strategy2016-2023.pdf

26 The PCG agreed to use the PCG meeting as a preparatory meeting for the Task Force meeting and allot more time for strategic discussion. Mr Ferretti and the PCC will prepare a proposal for a new structure.

DAY 2

Part 3. Ongoing activities

News from the data infrastructure

27 Mr Till Kirchner (PCC) reported on the latest developments of the data unit.

(a) **Status of the data portal.** The application programmer left the PCC and has not been replaced yet. The PCC hired external support for the data portal (DigSyLand). The portal should be running again in December.

(b) **Database revision.** All Manual changes could be implemented thanks to Ms Haggenmüller. Technical changes discussed at the EPM 2019 are largely implemented. Most surveys have been harmonized except for growth, litterfall, and soil solution. The new survey "S1 – Soil Level I" has been implemented and harmonized. S1 data has been integrated into the central DB and can now be submitted using the data portal.

(c) **News.**

(i) The **"Adds" folder**, which is always part of the ZIP archive when downloading data includes several new forms of value for working with the data:

(1) a dictionaries folder with tables for coded variables,

(2) an attribute catalogue describing the monitoring data,

(3) an overview of the number of plots submitted per partner and year,

(4) a data availability report showing what has been measured on a plot in a certain year,

(5) a quality information file with a new column with a QIF key for joining results from the lab and ringtests with monitoring data for chemical surveys,

(6) a ReadMe file describing the content of the "Adds" folder in detail.

(ii) **A new user guide for the data portal** has been published,[8] describing submission and download of data, how to use the data reports and check out data for resubmission.

(iii) **An open data data set (Level II)** is now available for checking the available data before officially applying for it.[9] It contains general plot descriptions with coordinates rounded to minutes, tree species observed per plot, a data availability report, and metadata (attribute catalogues). A Level I open data data set was not made available because some countries denied to publish even shortened coordinates of Level I plots.

(d) During the discussion, Mr Kirchner clarified that resubmissions will be possible for all surveys by December, and there should not be a problem with resubmitting older years. New

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[8] http://icp-forests.net/page/data-submission
 https://icp-forests.org/pdf/icpf_data_portal_user_guide.pdf
[9] https://icp-forests.org/open_data/

submissions overwrite older versions, the latter are archived. Time series should be submitted starting with the first year to allow consistency checks.

Ecological Studies book (ESB)

28 Mr Schwärzel informed the PCG about the **status of the Ecological Studies book and call for data resubmissions** and presented the time schedule until the TFM 2022. Data submissions will start again in December 2021.

29 Ms Prescher (PCC) presented **results from a request for missing data** sent to NFCs and ministries in June 2021. All active countries had responded by the end of October. Nearly all countries have additional data available, which is good for the ESB (but raises the question of why). Most resubmissions will be from Germany, Switzerland, and Norway, starting earliest in 1984. A substantial volume of data will be submitted from the 2000s, with a few countries submitting data as far back as the early 1990s. A lot of data is available from litterfall and soil solution. The actual number of plots per year and country, remains unknown. Ms Prescher offered to prepare an overview of EP/survey specific data by request.

30 During the discussion, it was noted that many surveys started at different times, so that it should not be expected that the time-coverage is the same over the years.

31 Ms Hilgers (PCC) presented a proposal for a **common workflow for editing data in the database**. To check whether the data used for analysis is up-to-date, she showed a 3-step-approach: check the time of download in the README.md file in the "Adds" folder, then check for survey updates and manual changes on the ICP Forests website[10]. She encouraged the PCG to write scripts so they can be rerun on updated data and offered to help transform Excel procedures into R code.

32 Discussion:

(a) Ms Hilgers confirmed that the editing of data already in the DB and the gap-filling of data will be handled separately.

(b) Mr Kirchner explained that for all data corrected by the PCC, a change date is given. Each table in the DB has a column called Qflag (Quality Flag). Rows that have been flagged with Qflag 20 were changed by the PCC. The date of changes of specific attributes are available on the website,[9] but are not flagged in the DB.

(c) All changes to the data in the DB are performed by the PCC only after contact with the partners. After data update the original data is still available, because all files ever uploaded to the DB are archived. For very old data which has not been officially submitted using the data portal, the original data may be lost after resubmission. Mr Kirchner will add a column to each table for differentiating between old and not tested data vs. data submitted using the data portal and having undergone quality checks. This will give an overview on which data should be carefully checked and resubmitted by the partners.

33 Ms Hilgers reported on the results of the **ESB lead author interviews on gap filling**. She had interviewed all authors except for the those of the chapter on biodiversity, which have not been determined yet. Results (e.g. code, data sets, Excel documents) are available on the Thünen Cloud for which she had emailed access instructions on Sept. 15. She gave an overview of the status of checking data and data resubmissions and on the support the PCC offers. She also uploaded gap-filling literature to the Thünen Cloud as a reference for gap filling procedures applied. She had asked Ms Giannetti, who created a rule-based algorithm for assigning European

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[10] http://icp-forests.net/page/changes-database

Forest Types to ICP Forests Level I plots, for code and will apply it to Level II plots for defining ecoclusters.

34 Discussion:

(a) Mr Kirchner clarified that dictionaries already contain codes for many special cases (e.g. bird droppings in deposition samplers). Issues can also be reported in the "Other observations" field or included in a data accompanying report and uploaded during data submission.

(b) Ms Hilgers explained that she had planned to perform the grouping of ecoclusters after the preparation of the data sets and the data submission deadline on Feb 15. Mr De Vos mentioned the possibility to run the routine and verify the results with the data already available before the deadline.

(c) Mr Kirchner specified that no additional information needs to be submitted for the new Quality Information Files (QIF). The information is taken directly from the LQA files and the ringtest results and automatically linked with the monitoring data. If LQA files are missing, the best way to proceed is to check out the data already in the DB, then add the LQA information and resubmit all respective forms.

(d) Information on the availability of high resolution dendrometer data is included in the data availability report for growth from the open data set[11]. There is no detailed overview of availability for this data from Level II plots across Europe. The EP Growth Chairs asked the partners for data resubmission, but various data issues are still unsolved.

(e) Mr Kirchner explained that the submission of LQA information of older data is possible. We cannot expect pre-2009 LQA information to be available, because it became mandatory only during FutMon in 2009.

35 Ms Hilgers reported on the **progress in cleaning and gap filling the meteorology data set**. Issues addressed were the handling of the code_plot_instr variable, the treatment of duplicate keys, outliers and impossible values, and the gap filling of the ERA5 data set. She will prepare a work plan together with the lead authors for all chapters and establish a repository in GitLab per survey for a transparent tracking of versions of code. Ms Hilgers offered a 2-hour training on how to use Git for anyone interested. Code will be available in Git, while documents will be accessible in the Thünen Cloud.

36 Discussion:

(a) Mr Kirchner stated that the issue of different partner codes for a given plot has been solved.

(b) It was clarified that only authors of the ESB will have access to cleaned and gap filled data sets for the preparation of the book. After the publication of the ESB, the data sets can be published as data papers.

(c) It was suggested to prioritize the most important variables per survey. The presented workflow will reveal problematic issues and highlight where to concentrate efforts.

(d) Soil temperature and soil humidity are important variables for many analyses; it was recommended to ask for their resubmission because of duplicate keys.

(e) It was suggested to establish some kind of structured direct approach of the EP Chairs, NFCs, and experts for discussing these kinds of issues.

(f) The use of left-centered statistics for values below the quantification limit is proposed, which is relevant for solid soil and soil solution analyses.

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[11] https://icp-forests.org/open_data/

37 Ms Prescher gave an **update on the integration of hourly meteorology data**. Several problems and inconsistencies were detected: missing PLM files, a huge number of required manual correction of errors and warnings after the plausibility checks, etc. Partners have been contacted and the data should be available by mid-December 2021.

Upcoming meetings

38 Ms Prescher reported on the **upcoming combined EP Meeting** on behalf of Mr Vít Šrámek (NFC Czechia). The meeting will be held 4–8 April 2021 at the Hotel Medinek in Kutna Hora. Mr Šrámek is still making enquiries whether a hybrid meeting will be possible at that venue. Ms Prescher presented the schedule and reminded the EP Chairs to get in contact with Mr Šrámek and inform him about the time requirement for their EPM. She asked the EP Chairs to CC her when contacting Mr Šrámek.

39 Discussion:

   (a) Mr Verstraeten noted that only the Chairs of the EPs with regular biannual EPM next year were contacted. EP Deposition would also like to meet in April.

   (b) The PCG discussed the structure of future combined EPMs and whether the traditional order of meetings should become more flexible. Side meetings of working groups could always be held at regular meetings. The Scientific Committee could be the place for discussing scientific co-operations. There will be another ESB meeting in January 2021, which can also be used for discussing co-operations. Please also refer to the discussion under Sections 52–53.

   (c) If a face-to-face meeting will not be possible, Mr Schwärzel offered that the PCC organizes an online meeting.

40 Because of the unclear COVID-19 situation, the PCG agreed that the next jEPM should be a hybrid meeting. If this necessitates a change in venue, then a venue in Prague, i.e. closer to an airport, should be considered. The PCC will get in contact with Mr Šrámek and discuss options and the further planning.

Concept data paper

41 Mr Kirchner presented a first draft of a **concept for a data paper** prepared by the PCC, to start discussions on a preferred data repository to store the data, a preferred journal to publish the data paper in, common harmonized metadata, and harmonized updating intervals of data sets. He described a typical data paper, which is characterized by a static archived data set, a DOI, metadata, and description of the content and creation of a data set. Monitoring data sets in comparison are updated continuously, so that its publication will result in inconsistencies and may make a data paper obsolete quickly. A solution already implemented by journals is the publication of different versions of data sets in a repository and publication of versioned algorithms.

42 Mr Kirchner proposed to refer to the currently available data in our database, collected according to the ICP Forests Manual, as *Layer 0*. Data papers in ICP Forests could then describe algorithms used to create gap-filled (unaggregated) data series, referred to as *Layer 1*. Aggregated parameters such as yearly sums or averages of daily measures will be derived from Layer 1. These aggregated data sets will be referred to as *Layer 2*. He listed many open questions and presented the further steps by the PCC, including a literature review and contacting journals, LTER, and ICOS. A 5-year interval between updates to the algorithms and the Layer 1/Layer 2 data sets was proposed.

43 Discussion:

(a) According to Mr Kirchner, the aim will be to develop algorithms for gap-filling, harmonizing and aggregating data, then automatize the publication process in a robust and reliable way. PCC could create those data sets and either store them in their own data structure or upload different versions in a version repository. Several journals do not specify the repository to be used.

(b) Mr De Vos proposed that ICP Forests establishes their own data repository and issues DOIs. Often journals are linked to specific surveys so he suggested to start discussions in the EPs about which journals are the most appropriate for data papers in their respective scientific community. He agreed with a five-year interval between updates.

(c) Mr Nicolas suggested the publication of data in a portal, e.g. Harvard Dataverse[12], where different data sets from different domains can be published in one global file. Scientists can then access the data directly, which may make use of ICP Forests more attractive; the availability of only metadata may not fulfil data users' needs.

(d) Mr Kirchner explained that there will be no problems with regard to the ICP Forests data policy. Each data publication will have to be accepted by the data providing partners. The TF will be asked for approval.

(e) The goal is to have each a clean data set ready for analyses for the ESB and publication as data paper.

(f) It still needs to be decided whether the code of the algorithm used for creating the final data set together with the data is published in a data paper or only described. He prefers to publish the code together with the data set.

(g) Mr Kirchner will present the concept to all EPs. As not all EPs meet next April, he may organize an online meeting or start an email discussion.

44 <u>The PCC will develop a concept to be shared before the next EPM asking for comments, then present a concept at the next TFM.</u>

Ongoing and upcoming projects/studies

45 Ms Prescher reported on the **review and revision of the empirical critical loads for N (CLempN)**, which is a very important publication of the ICP M&M and highly valued by the WGE. ICP Forests was not involved in the last report from 2010, but it was this year with Ms Sabine Augustin, Ms Prescher, Ms Ukonmaanaho, Ms Elena Vanguelova, and Mr Waldner as contributing authors. Ms Prescher had attended the expert workshop in Bern, Switzerland, from 26–28 Oct. 2021, as the only representative from ICP Forests. She showed an overview of the new CLempN, which will be officially announced and published next year. Most CLempN for many forest types (EUNIS categories) and ecosystem types decreased as a result of published findings over the last years on N effects.

46 Discussion:

(a) Ms Prescher noted that the effect of N on tree growth was discussed but in the end tree growth was not used as an indicator of exceedance as it did not appear sensitive enough.

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[12] https://data.harvard.edu/dataverse

AOB

What additional useful sampling/measurement operations should be planned in Level II plots just before the final cutting?

47 Mr Nicolas presented plans for additional samplings/measurements the NFC France (Level II) will implement on three Level II plots to be harvested in the next two years after 30 years of monitoring. These include the taking of coordinates of trees and monitoring devices, a ground vegetation assessment, foliar or bud sampling for genetic characterization, tree coring with three replicates/tree, an extra survey to complete periodic growth data series, and solid soil sampling. He then asked the PCG for further ideas and methods/guidelines.

48 Suggestions for additional measurements and comments by the PCG:

(a) Taking stem discs after the cutting for chemical analysis and detailed growth measurements.

(b) Height growth over time.

(c) Epiphytic lichens.

(d) Mapping of fine root patterns and intensity per depth for modelling water and nutrient uptake. This can be done any time before the cutting.

(e) Using cut trees to calculate the leaf area index, especially in conifers.

(f) Biomass measurements for different tree parts (stem, branches, foliage) and allometric measurements of trees as on two Swiss test plots in the Swiss Biomass project[13]. Mr Waldner offered to provide contact information.

(g) For coring, three replicates seem fine; the more the better especially if no stem discs are taken. The NFC Slovenia takes two. For chemical analysis/X-ray of tree rings, thicker cores with a diameter of 12 mm should be taken instead of 5 mm.

(h) Ms Sanders offered to provide contact information for one of the Thünen Institutes, which does a lot of tree genetic sampling and characterization. For tree coring she suggests use of the field guidelines which have been established over the years and are well known for dendroecological sampling. She also suggests reservation of one of the tree cores for isotopic analyses, e.g. to determine the water use efficiency, and get a 3D model of the stand from a UAV before the final cut to get a complete picture of the stand.

(i) Mr Fleck emphasized the importance of genetic characterization and identification of provenances in phenology. He also suggested 3D terrestrial laser scans to have a permanent record of the structure of the canopy.

(j) Mr Nicolas noted that it is not yet clear whether the plots will continue to be monitored after the final cut. Mr De Vos suggested to continue with the soil solution monitoring if installed on the plots, to see what happens to soil temperature and soil moisture when the forest cover is removed.

49 Mr Ferretti encouraged Mr Nicolas to share his experiences with the other NFCs. The development of guidelines could be a topic for the next Manual revision.

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[13] https://www.wsl.ch/en/projects/swiss-biomass.html

EP internal communication

50 Ms Prescher asked the PCG for information on how EP Chairs communicate with national experts, and how decisions are taken within the EPs. This was motivated by feedback from some national experts, who felt left out from decisions on the revision of the Manual.

51 Discussion:

(a) Communication in most EPs is carried out by email. If countries do not respond, they are counted as consenting. Usually, decisions are made by mutual consent of the active experts.

(b) Long periods between surveys are making it more difficult to stay in contact with experts, as some experts are hired only for a specific survey period.

(c) Manual changes were usually discussed at the EPM, but response is often low from experts. EPs prepare decisions and share information before the TFM, and their adoption lies with the TF.

52 The PCC will prepare guidelines on how to download the list of experts[14] in MS Excel and send a yearly reminder to the NFCs asking for an update of their experts' contact information.

Future EP meetings

53 Ms Prescher presented a **proposal to hold EP meetings on an annual basis**, alternating between online and physical meetings. However, all EPs should meet in 2022 in preparation of the ESB. Online meetings can be organized by the PCC.

(a) Mr Potočić agreed on an online EP Crown meeting next April for the preparation of the ESB. He prefers biannual physical meetings with online meetings in between if necessary.

(b) Mr De Vos informed about the EP's plans for an online EP Soil and Soil Solution meeting next year and welcomed the support of the PCC.

(c) Ms Cools argued against a combined EPM if it is online. If online it seems better to have the different EP meetings separately to be able to attend different sessions.

(d) Each panel should organize the content and structure its own meeting if online, but all should fall within one week as this will make it easier for the PCC to organize them as a Webex meeting.

(e) EP Deposition would also like to meet in April.

54 PCC will prepare a draft structure of future EP meetings and share it with the PCG.

Miscellaneous

55 Mr Ferretti informed about the preparation of a report by Mr Filip Moldan (ICP M&M – Centre for Dynamic Modelling) on the **modelling work undertaken by the different ICPs** to identify knowledge gaps and define areas of common interest. Ms Hilgers, Mr Raspe and Mr Waldner offered to discuss modelling work in ICP Forests with Mr Moldan together with Mr Ferretti and Mr Schwärzel.

Closing of the PCG meeting

56 Mr Ferretti thanked Ms Beez and the BMEL for providing the resources for this year's PCG meeting and for the social dinner. He thanked all participants attending face-to-face and online for their contributions, and the PCC for the organization, their accomplishments and progress. He then closed the meeting.

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[14] http://icp-forests.net/page/expertlist

Action Points

Topic	Task	Responsible	Due date	Done
Report of the PCC	Contact the EC about an interface with the ICP Forests DB for NECD reporting	PCC	ASAP	Yes
	Share results from next meeting with LUBo about Forest Europe / ICP Forests Webinar	PCC	December 2021	Meeting will take place on Dec 9
Report of the Scientific Committee	Distribute minutes of last meeting and invite PCG to share ideas about conference theme, keynotes, format of poster session	Mr Schaub, Mr Vesterdal	ASAP	
Technical Report	Prepare guidelines for chapter "Recent findings and perspectives" and share with PCG	PCC	January 2021	
	Prepare a plan for EP contributions (scientific chapters) in future TRs and share with PCG	PCC	January 2021	
Assessment Report 2025	Plan future steps and share with PCG	Mr Ferretti	Not yet defined	
Questionnaire for programme leavers	Inform PCC about changes in positions	NFCs	When applicable	
	Prepare checklist and supervise knowledge transfer	PCC	Not yet defined	
	Prepare draft questionnaire and share with PCG	PCC	December 2021	Yes
ICP Forests website: Expert list	Prepare guidelines on how to download and open list	PCC	November 2021	Yes
	Send yearly reminder to NFCs asking for an update of expert list	PCC	Oct/Nov each year	
Data resubmissions	Add a column to each table for differentiating between old and not tested data vs. data submitted using the data portal and having undergone quality checks.	PCC	Not yet defined	
Data paper concept	Develop concept and share with PCG	PCC	Before next EPM	
New structure for future PCG meetings	Prepare proposal for new structure	Mr Ferretti, PCC	Fall 2022	
Future EP meetings	Prepare draft structure and share with PCG	PCC	Before next EPM	
Upcoming meetings	Inform Mr Šrámek on time requirement in next EPM	EPs	ASAP	
	Discuss options and further planning under ongoing COVID pandemic	PCC	ASAP	Yes

List of Participants

Last name	First name	Institution	Country
Augustin	Sabine	Federal Office for the Environment BAFU	Switzerland
Beez	Juliane	Federal Ministry of Food and Agriculture BMEL	Germany
Canullo	Roberto	University of Camerino	Italy
Cools	Nathalie	Research Institute for Nature and Forest INBO	Belgium
De Vos	Bruno	Research Institute for Nature and Forest INBO	Belgium
Ferretti	Marco	Swiss Federal Research Institute WSL	Switzerland
Fleck	Stefan	Nordwestdeutsche Forstliche Versuchsanstalt NW-FVA	Germany
Fürst	Alfred	Austrian Research Centre for Forest BFW	Austria
Gottardini	Elena	Fondazione Edmund Mach	Italy
Haggenmüller	Katrin	Thünen Institute of Forest Ecosystems	Germany
Hilgers	Catherine	Thünen Institute of Forest Ecosystems	Germany
Kirchner	Till	Thünen Institute of Forest Ecosystems	Germany
Kowalska	Anna	Forest Research Institute	Poland
Levanič	Tom	Slovenian Forestry Institute SFI	Slovenia
Michel	Alexa	Thünen Institute of Forest Ecosystems	Germany
Nicolas	Manuel	Office national des forêts ONF	France
Nieminen	Tiina M.	Natural Resources Institute Finland LUKE	Finland
Pitar	Diana M.	National Institute for Research and Development in Forestry "Marin Dracea"	Romania
Potočić	Nenad	Croatian Forest Research Institute	Croatia
Prescher	Anne-Katrin	Thünen Institute of Forest Ecosystems	Germany
Raspe	Stephan	Bavarian State Institute of Forestry LWF	Germany
Rautio**	Pasi	Natural Resources Institute Finland LUKE	Finland
Sanders	Tanja	Thünen Institute of Forest Ecosystems	Germany
Schaub*	Marcus	Swiss Federal Research Institute WSL	Switzerland
Schmidt	Andrea	Thünen Institute of Forest Ecosystems	Germany
Schwärzel	Kai	Thünen Institute of Forest Ecosystems	Germany
Timmermann	Volkmar	Norwegian Institute of Bioeconomy Research NIBIO	Norway
Ukonmaanaho	Liisa	Natural Resources Institute Finland LUKE	Finland
Verstraeten	Arne	Research Institute for Nature and Forest INBO	Belgium
Vesterdal	Lars	University of Copenhagen	Denmark
Waldner	Peter	Swiss Federal Research Institute WSL	Switzerland

* Mr Schaub was attending the meeting on day 1 only.

**Mr Rautio was attending the meeting on day 2 only.

Meeting of the Programme Co-ordinating Group (PCG) of ICP Forests

Venue: NH Hotel Alexanderplatz, Berlin | Hybrid meeting
Date: 9 -10 Nov 2021

Please note: Prior to the PCG meeting, the Quality Assurance Committee (10:30 to 12:00) will meet at the same venue.

Agenda

Symbols:
<>:   approx. time foreseen
(xx):   contribution from

9 Nov. 2021, Tuesday	Chairperson Day 1: Marco
Start: 13:00	**Opening <0:10>** (Marco) - Adoption of agenda **Welcome Note <0:05>** (Juliane Beez)
	Part 1. Reporting
	Report of the PCC <0:20> (Kai, Alexa) - Progress since the 37th TFM - News from the PCC - Forest Europe, EFI, NECD

	Report from the EPs and committees <1:25> (EP chairs, each EP has 7 minutes)
	- Short presentation of the most important publication in 2021
	- Planned outcomes in 2022
	  • EP Crown Condition and Damage Causes (Nenad, Volkmar)
	  • EP Forest Growth (Tom, Tanja)
	  • EP Biodiversity and Ground Vegetation (Roberto, Jean-Luc)
	  • EP Ambient Air Quality (Diana, Elena)
	  • EP Deposition (Arne, Daniel, Peter)
	  • EP Soil and Soil Solution (Bruno, Nathalie, Tina)
	  • EP Foliage and Litterfall (Pasi, Liisa)
	  • EP Meteo, Phenology and LAI (Stephan, Stefan)
	  • Working Group on QA in Labs (Alfred, Anna)
	  • QA Committee (Manuel)
	  • Scientific Committee (Marcus, Lars)

15:00 – 15:30	**Coffee break <0:30>**
	Current and future reporting <1:00> Technical Report (Alexa) - Structure of TR 2022 and its presentation at the TF - Contributions of EP to the TR (Alexa) Brief (Alexa) - editorial guidelines, process and procedure. New proposal (Marco, all) - A comprehensive assessment report in 2025
	Part 2. Strategic questions <1:00> (Marco, all)

	Foster identification and solution for important strategic questions for the programme, for example:
	- WGE strategy and role of EPs
	- Program related questions, for instance:
	  a) How to start, or co-operate with, a remote sensing component?
	  b) How to start, or to co-operate with, a modeling component?

	c) How to obtain missing countries back to the programme and how to expand to other countries? Which active policy and support can be put in place? d) Role in future monitoring e) Further reflect on our role and organization in international calls – see recent/ongoing experience Horizon Europe - EPs are asked to provide own strategic questions here.
End: 17:30	
19:30	Social Dinner
10. Nov 2021, Wednesday	Chairperson Day 2: Kai
	Part 3. Ongoing activities
Start 8:30	**News from the data infrastructure <0:35>** (Till)
	Ecological Studies Book. <1:00> (Kai, Anne, Catherine) - Questionnaire about missing data; overview (Anne) - Editing data in the database: how communicate changes, how to stay up to date (Catherine) - Results of the lead author interviews (Catherine) - Meteo data set/ Gap filling (Catherine) - Hourly data (Anne)
	Upcoming meetings <0:25> - Combined meeting of the Expert Panels; March 2022 (PCC) - 38th Task Force Meeting 2022: Helsinki (Päivi) - 10th Scientific Conference 2022: Helsinki (Marcus) - Other meetings/conferences
10:30-11:00	**Coffee break <0:30>**
	Concept data paper <0:30> (Till, Catherine, Katrin, Kai) - Short presentation as starting point for the discussion
	Ongoing and upcoming projects/studies <0:15>
	AOB <0:45> - What additional useful sampling/measurement operations should be planned in LII plots just before the final cutting? (Manuel) - EP internal communication: How do you ensure that all national experts are reached and involved in decision making? - Future EP meetings: Should there be annual meetings, one year online, the other year physical?
End: 12:30	**Closing of the PCG Meeting**