

Activities & progress since the 4th WGE-EMEP Meeting

Kai Schwärzel & Marco Ferretti



5th WGE-EMEP meeting, Geneva

9 -13 Sept 2019

Outline

- 8th ICP Forests Scientific Conference and 35th Task Force Meeting in Ankara, Turkey
- PCC publications and ICP Forests brief
- Realization of the 2018-2019 workplan for the implementation of the convention
- Suggestions for the 2020-2021 workplan of the convention
- Cooperations and services

8th ICP Forests Scientific Conference and 35th Task Force Meeting

- 43 participants from 21 countries



PCC reports and ICP Forests briefs in 2018/2019



Aims of the ICP Forests Briefs is

- **to raise awareness for forest-related environmental topics**
- **to inform practitioners, policy makers and the broad public on key findings of the ICP Forests monitoring programme**
- **to stimulate the debate on the effects of air pollution on forest ecosystem functions and services**

33 international, peer-reviewed publications in 2018

with data that had either originated from the ICP Forests database or from ICP Forests plots

- Addressing WP Items
 - 8 publications on nitrogen, 3 on ozone, 1 on HM

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

Realization of the 2018-2019 workplan for the implementation of the convention

Levels and effects of ground-level ozone

Workplan 2018/2019, items 1.1.1.19, -.20



Marcus Schaub

2018-2019 WP: Ozone – Awareness raising and advocacy

ICP FORESTS BRIEF #3
2018

LRTAP

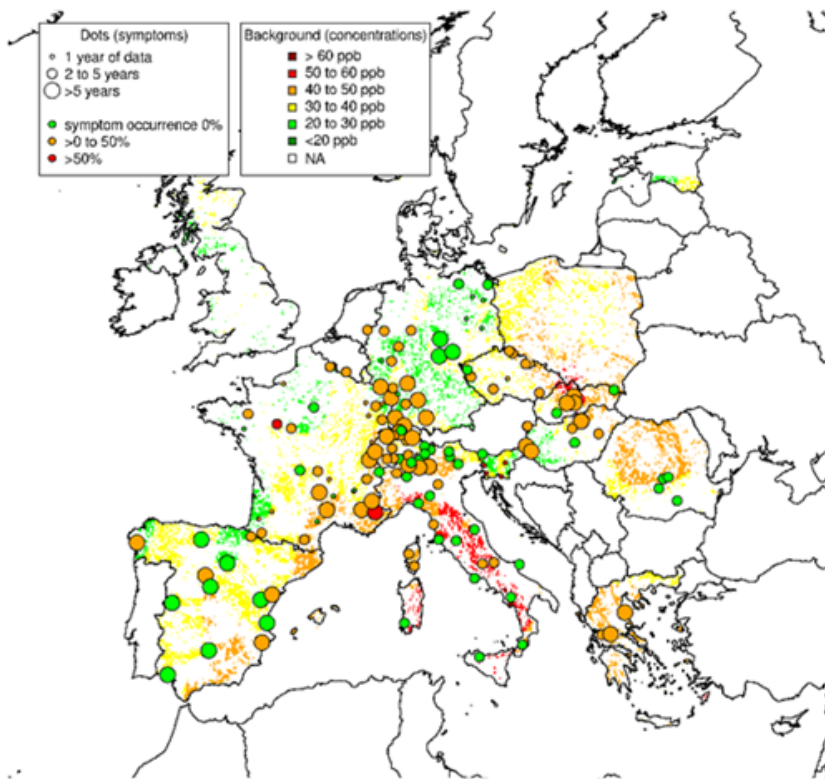
ICP Forests

Ozone concentrations are decreasing but exposure remains high in European forests

KEY MESSAGES

- 1 Ozone is a gaseous air pollutant present in remote areas at levels causing visible symptoms in plants
- 2 Despite a significant reduction, ozone levels at ICP Forests sites still exceed the threshold value for adverse effects
- 3 Ozone-induced foliar symptoms have been observed on woody plant species all across Europe
- 4 Further observational and long-term monitoring studies are needed to better quantify dose-response relationships and a potential impact on forest growth

THÜNEN WSA wge ICP Forests



Assessing and estimating ozone impacts on forest vegetation – opportunities for improved co-operation

12 April 2019

Swiss Federal Research Institute WSL
supported by the Swiss Federal Office for the Environment FOEN

Participants: 17 scientists from nine countries



Participants to the Joint Workshop, left to right:

S. Braun (CH), K. Schwärzel (D), M. Cailleret (F), A. De Marco (I), S. Augustin (CH), R. Alonso (E), L. Emberson (UK), L. Schönbeck (CH), M. Ferretti (CH), M. Schaub (CH), H. Harmens (UK), M. Häni (CH), G. Gerosa (I), T. Levanič (SLO), E. Gottardini (I), M. Pulkkinen (FIN). Not in photo: P.-E. Karlsson (SWE)

2018-2019 WP: Ozone – Capacity development & Cooperation

- **Joint ICP Forests and ICP Vegetation Expert Workshop**
Assessing and estimating ozone impacts on forest vegetation – opportunities for improved cooperation , Birmensdorf, Switzerland, 12 Apr 2019
- **14th Ozone Intercalibration Course**
Poreč, Croatia , 10-13 Sept 2018
- **Meeting of Expert Panel on Ambient Air Quality**
Zvolen, Slovakia, 1-5 Oct 2018

N deposition and its effects on forests

Workplan 2018/2019, items 1.1.1.21, -.22



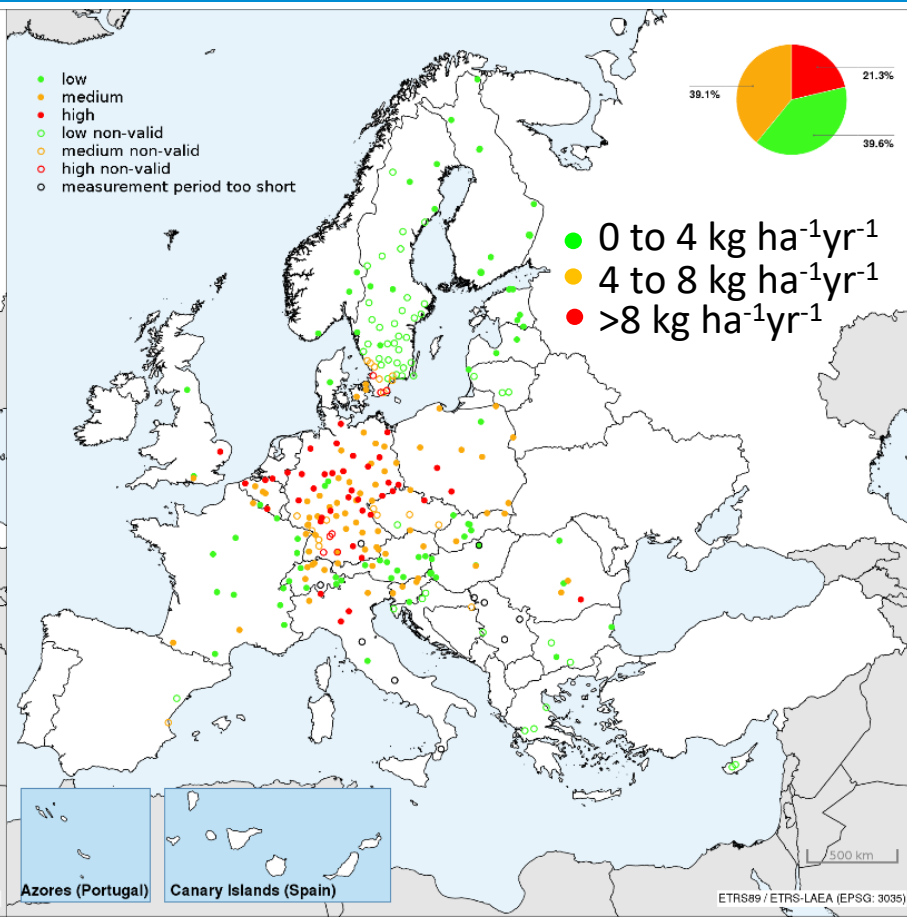
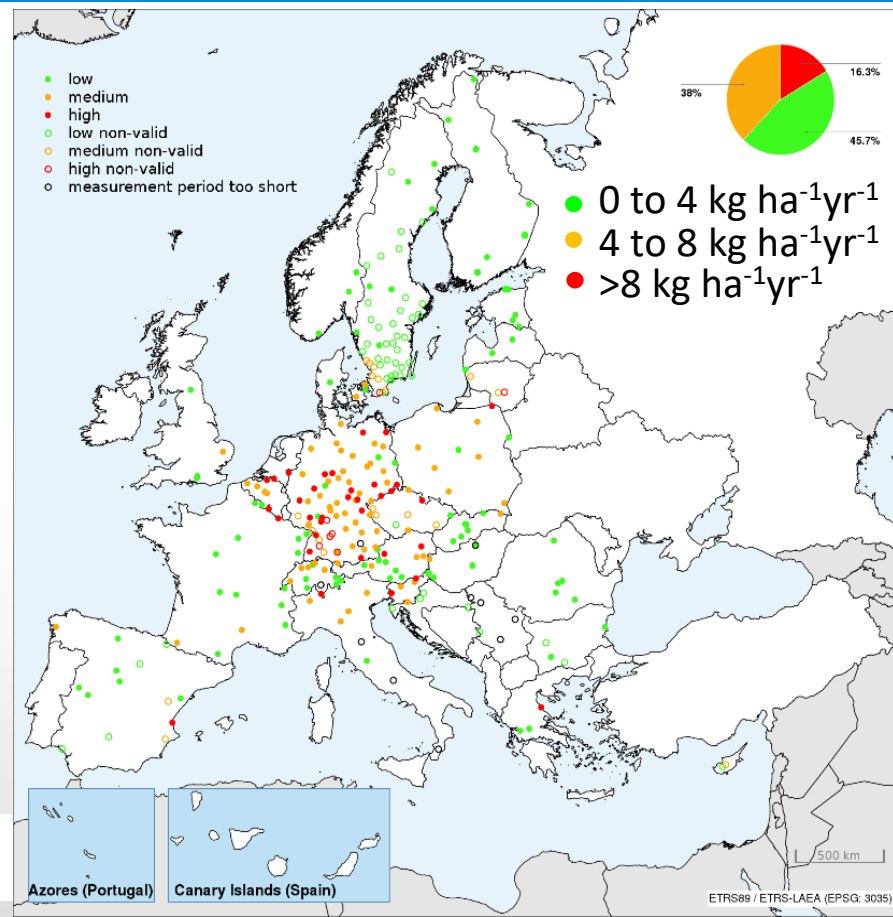
2018-2019 WP: Nitrogen deposition – Awareness raising



- Inorganic nitrogen depositions are decreasing but a substantial proportion of ICP Forests sites are still at risks of eutrophication

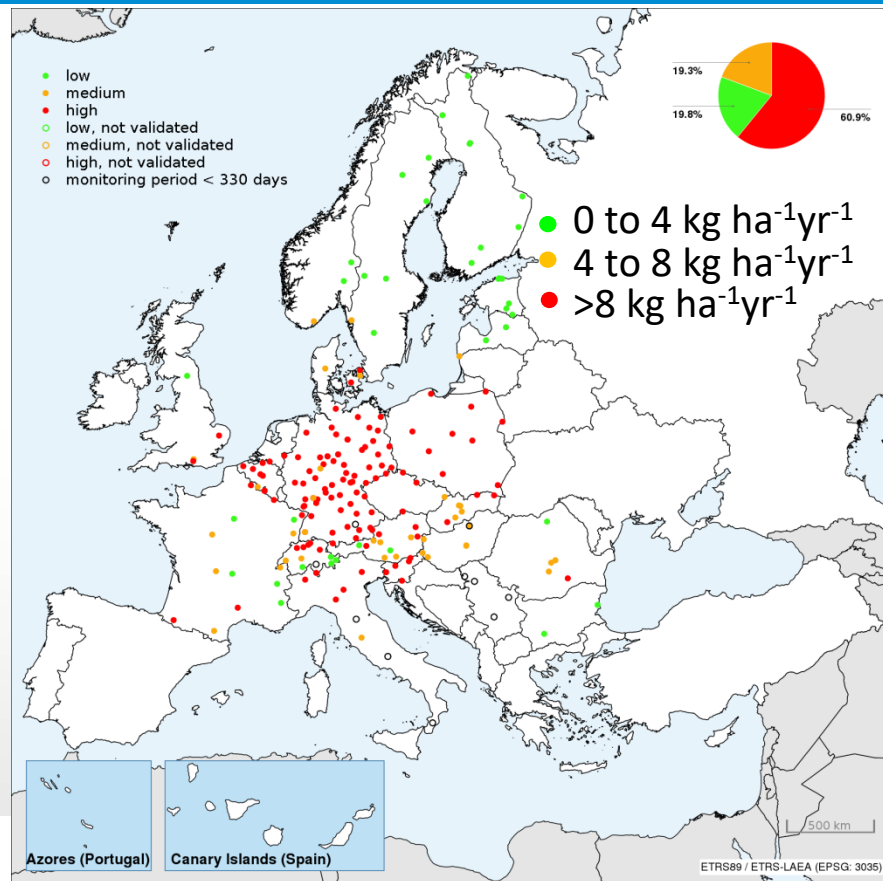
Throughfall deposition (stand deposition) in 2017

Nitrate-Nitrogen -----[kg N ha⁻¹ yr⁻¹]----Ammonium-Nitrogen



Throughfall deposition (stand deposition) in 2017

Total Inorganic Nitrogen [$\text{kg N ha}^{-1} \text{ yr}^{-1}$]



Tab. Empirical critical loads of Nitrogen depositions (Bobbing and Hettelingh, 2011)

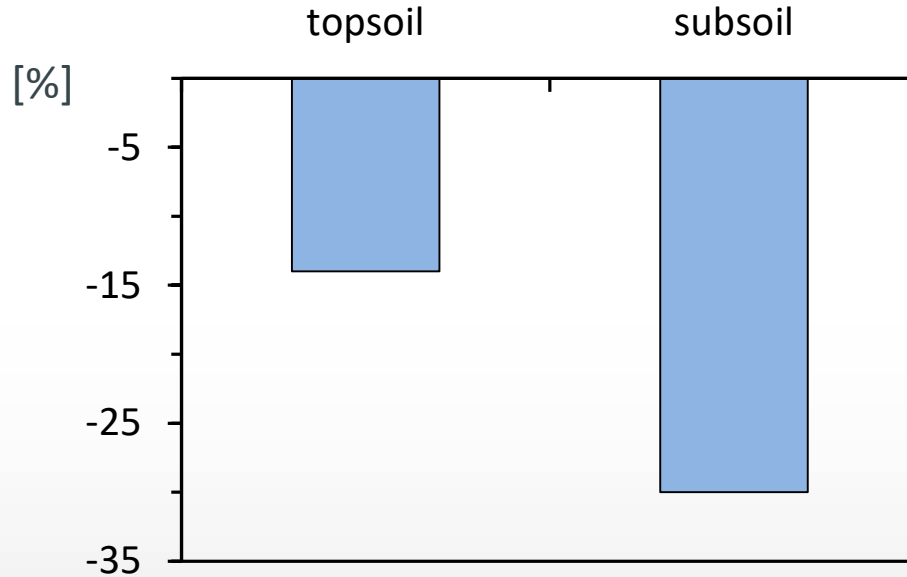
Ecosystem Type	Kg N $\text{ha}^{-1} \text{ yr}^{-1}$	Indication of exceedance
Broadleaved deciduous woodland	10 to 20	<ul style="list-style-type: none"> changes in soil processes nutrient imbalance altered composition
Fir and spruce woodland	5 - 15	<ul style="list-style-type: none"> mycorrhiza and ground vegetation

N canopy exchange at German level II plots in % of throughfall deposition

Spruce and pine	Oak and beech
10 - 17%	17 – 33%

Schmitz, 2019 unpublished

Change in Nitrate concentration in soil solution for a ten-year period relative to the year 2000



based on 171 ICP Forests plots across Europe

Despite Nitrate decrease in soil solution threshold for critical N leaching and saturation are often exceeded

- **Topsoil: at 44% of the plots median concentrations greater than 1 mg N l⁻¹**
- **Subsoil: 31% of the plots median concentrations greater than 1 mg N l⁻¹**

Tree nutrition is increasingly imbalanced in European forests

by

Inken Krüger¹, Tanja GM Sanders¹, Nenad Potočić², Liisa Ukonmaanaho³, Pasi Rautio³

¹Thünen Institute of Forest Ecosystems

²Croatian Forest Research Institute

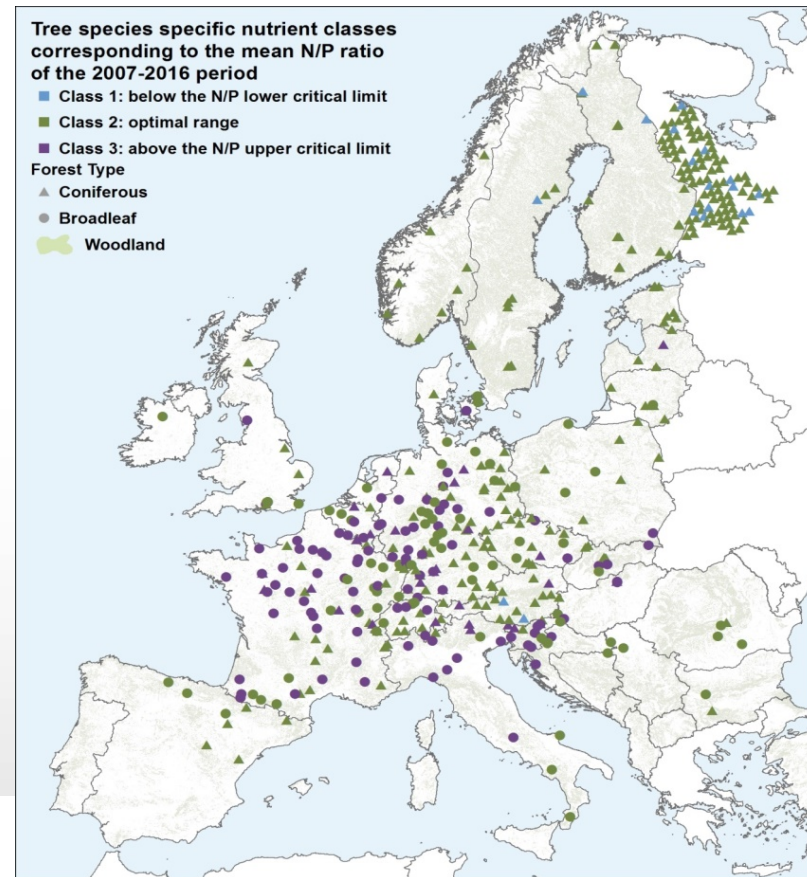
³National Resources Institute Finland (LUKE)

- (1) Foliar nitrogen/phosphorus (N/P) ratios can be used to assess the effects of nitrogen excess on forest nutrition
- (2) Nitrogen excess results in decreasing foliar P concentrations because the mobilization of P in forest soils is slow
- (3) 30% of Level II plots across Europe show imbalances in foliar N/P ratios
- (4) Detected nutrient imbalances may impact forest productivity and tree vitality

30% of Level II plots across Europe show imbalances in foliar N/P ratios

Critical N/P ratios (from Mellert & Göttlein 2012)

Tree species	N/P ratio
<i>Fagus sylvatica</i>	10 to 19
<i>Quercus robur</i> + <i>Quercus petraea</i>	9 to 20
<i>Pinus sylvestris</i>	7 to 14
<i>Picea abies</i>	6 -12



Heavy metals in forest ecosystems

Workplan 2018/2019, items 1.1.1.23, -.24



2018-2019 WP: Heavy Metals– Capacity development & Cooperation

- Meeting Heads of the Labs, Braşov, Romania, 5-6 Sept 2019
- 21th Needle/Leaf Inter-laboratory Comparison Test 2018/2019. Technical Report QA-R Foliar19 (A. Fürst, Austrian Research Centre for Forests)
- Soil Inter-laboratory Test Programme - 9th Test 2018 (T. Jakovljevic, Croatian Forest Research Institute)

HMs in forest ecosystems – ongoing studies

- Development of **sampling system for the measurement of mercury in deposition** (N. König)
- **Measuring Hg in foliage samples**
(L. Wohlgemuth, University of Basel)

Suggestions for the 2020-2021 workplan of the convention

ICP Forests contribution to the 2020-2021 workplan of the convention (general)

- **Reports about status and trends of**
 - 1) ozone levels and visible injury on forest trees
 - 2) N deposition in Europe
 - 3) HM levels in European forests

ICP Forests contribution to the 2020-2021 workplan of the convention (specific)

Activity description/objective	Expected outcome/deliverable	Resource requirements (in US\$)
Ozone flux-response relationships by means of DO3SE model (ICP Vegetation) and ICP Forests ozone data and response parameters	Ozone effect on radial tree growth across Europe (2021)	National funding
N deposition and its effects on forest vegetation (monitoring activities according to the ICP Forests Manual)	Reports about status and trends of N levels in European forests (2020, 2021)	Covered by recommended contributions
Status and trends of heavy metals in forest ecosystems	(1) Maps of heavy metal concentrations across Europe for two different survey periods (2020) (2) Scientific paper/ report (2021)	22.000

A joint EANET-ICP Forests

Workshop

on regional impact assessment of
atmospheric deposition and air pollution on forest ecosystems

21-22 Nov 2019 Niigata, Japan

9th Scientific Conference and 36th Task Force Meeting 2020

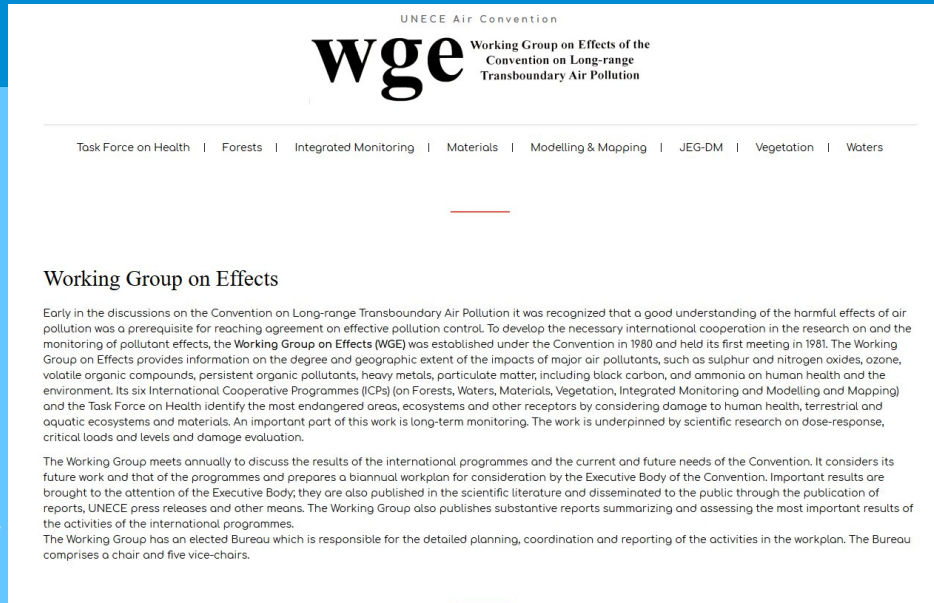
You are kindly invited to join the ICP Forests community
in Birmensdorf/Zurich, Switzerland, 9-12 June 2020



Fabrice Blanc

Common WGE portal

Workplan 2018/2019, items 1.4.3



UNECE Air Convention

wge

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

[Task Force on Health](#) | [Forests](#) | [Integrated Monitoring](#) | [Materials](#) | [Modelling & Mapping](#) | [JEG-DM](#) | [Vegetation](#) | [Waters](#)

Working Group on Effects

Early in the discussions on the Convention on Long-range Transboundary Air Pollution it was recognized that a good understanding of the harmful effects of air pollution was a prerequisite for reaching agreement on effective pollution control. To develop the necessary international cooperation in the research on and the monitoring of pollutant effects, the **Working Group on Effects (WGE)** was established under the Convention in 1980 and held its first meeting in 1981. The Working Group on Effects provides information on the degree and geographic extent of the impacts of major air pollutants, such as sulphur and nitrogen oxides, ozone, volatile organic compounds, persistent organic pollutants, heavy metals, particulate matter, including black carbon, and ammonia on human health and the environment. Its six International Cooperative Programmes (ICPs) (on Forests, Waters, Materials, Vegetation, Integrated Monitoring and Modelling and Mapping) and the Task Force on Health identify the most endangered areas, ecosystems and other receptors by considering damage to human health, terrestrial and aquatic ecosystems and materials. An important part of this work is long-term monitoring. The work is underpinned by scientific research on dose-response, critical loads and levels and damage evaluation.

The Working Group meets annually to discuss the results of the international programmes and the current and future needs of the Convention. It considers its future work and that of the programmes and prepares a biannual workplan for consideration by the Executive Body of the Convention. Important results are brought to the attention of the Executive Body; they are also published in the scientific literature and disseminated to the public through the publication of reports, UNECE press releases and other means. The Working Group also publishes substantive reports summarizing and assessing the most important results of the activities of the international programmes.

The Working Group has an elected Bureau which is responsible for the detailed planning, coordination and reporting of the activities in the workplan. The Bureau comprises a chair and five vice-chairs.

<http://unece-wge.org/>

First version of the WGE homepage has been presented in Vienna (March 2019)

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

It was decided to create an interactive mapping application showing sites from different ICPs

Workplan 2019: WGE homepage

- **Information for the mapping application has been requested in May**
- **Mapping application has been created in July**
- **Feedback has been requested end of August**

Information integrated in the map application

- **Network (ICP)**
- **Country**
- **Plot identifier**
- **Latitude / longitude** (not exact)
- **EUNIS class**
- **Data available** (yes/no)
 - Solid soil
 - Deposition
 - Air concentrations (O₃, ...)
 - Water
 - Vegetation
 - Meteorology