Expert Consultation Meeting on NEASPEC activities in the field of Transboundary Air Pollution in North-East Asia,
20-21 January 2011, Incheon, Republic of Korea

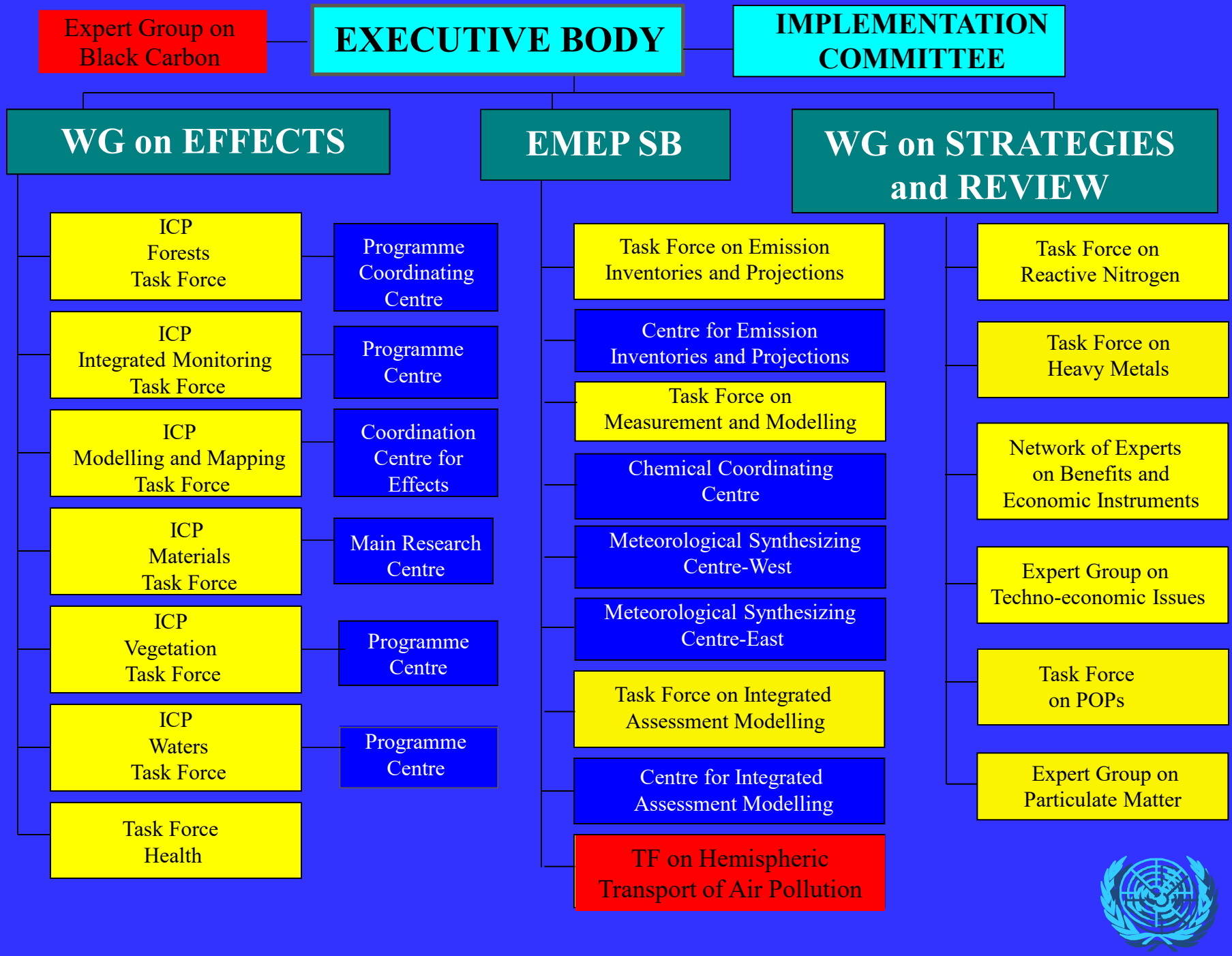
Institutional and scientific framework for assessment of environmental impacts of air pollution within the UNECE CLRTAP

Krzysztof OLENDRZYŃSKI

Secretariat of the LRTAP Convention,

UNECE, Geneva, Switzerland

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE


Expert Group on Black Carbon
EXECUTIVE BODY
IMPLEMENTATION COMMITTEE
WG on EFFECTS
EMEP SB
WG on STRATEGIES and REVIEW
ICP Forests Task Force
ICP Integrated Monitoring Task Force
ICP Modelling and Mapping Task Force
ICP Materials Task Force
ICP Vegetation Task Force
ICP Waters Task Force
Task Force Health
Programme Coordinating Centre
Programme Centre
Coordination Centre for Effects
Main Research Centre
Programme Centre
Programme Centre
Task Force on Emission Inventories and Projections
Centre for Emission Inventories and Projections
Task Force on Measurement and Modelling
Chemical Coordinating Centre
Meteorological Synthesizing Centre-West
Meteorological Synthesizing Centre-East
Task Force on Integrated Assessment Modelling
Centre for Integrated Assessment Modelling
TF on Hemispheric Transport of Air Pollution
Task Force on Reactive Nitrogen
Task Force on Heavy Metals
Network of Experts on Benefits and Economic Instruments
Expert Group on Techno-economic Issues
Task Force on POPs
Expert Group on Particulate Matter

UNECE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION (LRTAP)

Current priorities of the LRTAP Convention as adopted in the decisions by Executive Body at its 28th session in 13-17 December 2010 :

- Revision of the 1999 Gothenburg Protocol to be completed by the end of 2011!
- Revision of the 1998 Aarhus Heavy Metals Protocol and POPs Protocols
- Capacity building in EECCA-SEE countries in ratifying and implementing various protocols under the convention

Current LRTAP priorities - continued:

- Implementation of the Long-term Strategy of the Convention adopted by Executive Body Dec. 2010

- **historic decisions on black carbon and other short-lived climate forcers (SLCFs): tropospheric ozone and its precursors including methane and carbon monoxide**

- **Outreach and need for further inter-regional collaboration (EMEP/WGE/LRTAP /ECE – EANET, NEASPEC, Other?)**

- Revision of the Gothenburg Protocol (GP) to abate acidification, eutrophication and ground-level ozone

(emission ceilings, limit values); inclusion of PM (PM2.5); new scenarios; level of ambition)

Long-term Strategy (LTS) of the Convention

- gives high importance to increased ratification and implementation of the latest three protocols; flexible and consensual process
- remaining challenges: PM, O3, eutrophication, (reactive) N, including contribution from LRT of AP
- outreach and inter-regional collaboration (EANET, UNEP, UN FCCC, GAPF, …
- maintaining close links between science and policy
- coupling of air pollution, climate change and biodiversity; considers geographical and pollutant wise extension, SLCFs, CH4 and CO as ozone precursors

Co-operative Programme for monitoring and evaluation of the long range transmission of air pollutants in Europe - EMEP

Five EMEP Centres on emissions/measurements and modelling are listed below in *italics*

EMEP Emissions – Task Force Emmison Inentories and Projections (TF EIP, UK) - *CEIP* (AT)

EMEP Measurements - TF Measurements &Modelling (TF MM, UK ,WMO) – *Chemical Coordinating Centre* (CCC, NO)

EMEP Models – Unified EMEP Model (*MSC-W*, NO), HMs and POPs Models (*MSC-E*, RU), GAINS (*CIAM*, IIASA

TF Integrated Assessment Modelling (TFIAM, NL)

TF Hemispheric Transport of Air Pollution (TF HTAP, US, EU)

More details at:http://www.emep.int

Working Group on Effects

The Working Group on Effects and its Bureau are responsible for the planning, coordination and reporting of the effects-oriented activities. The operational aspects of the effective implementation of the workplan are fulfilled by the Extended Bureau of the Working Group on Effects comprising the Bureau of the Working Group, the Chairs of the Task Forces and the Joint Expert Group on Dynamic Modelling, and the representatives of the programme centres of the International Cooperative Programs - ICPs.

More details at:

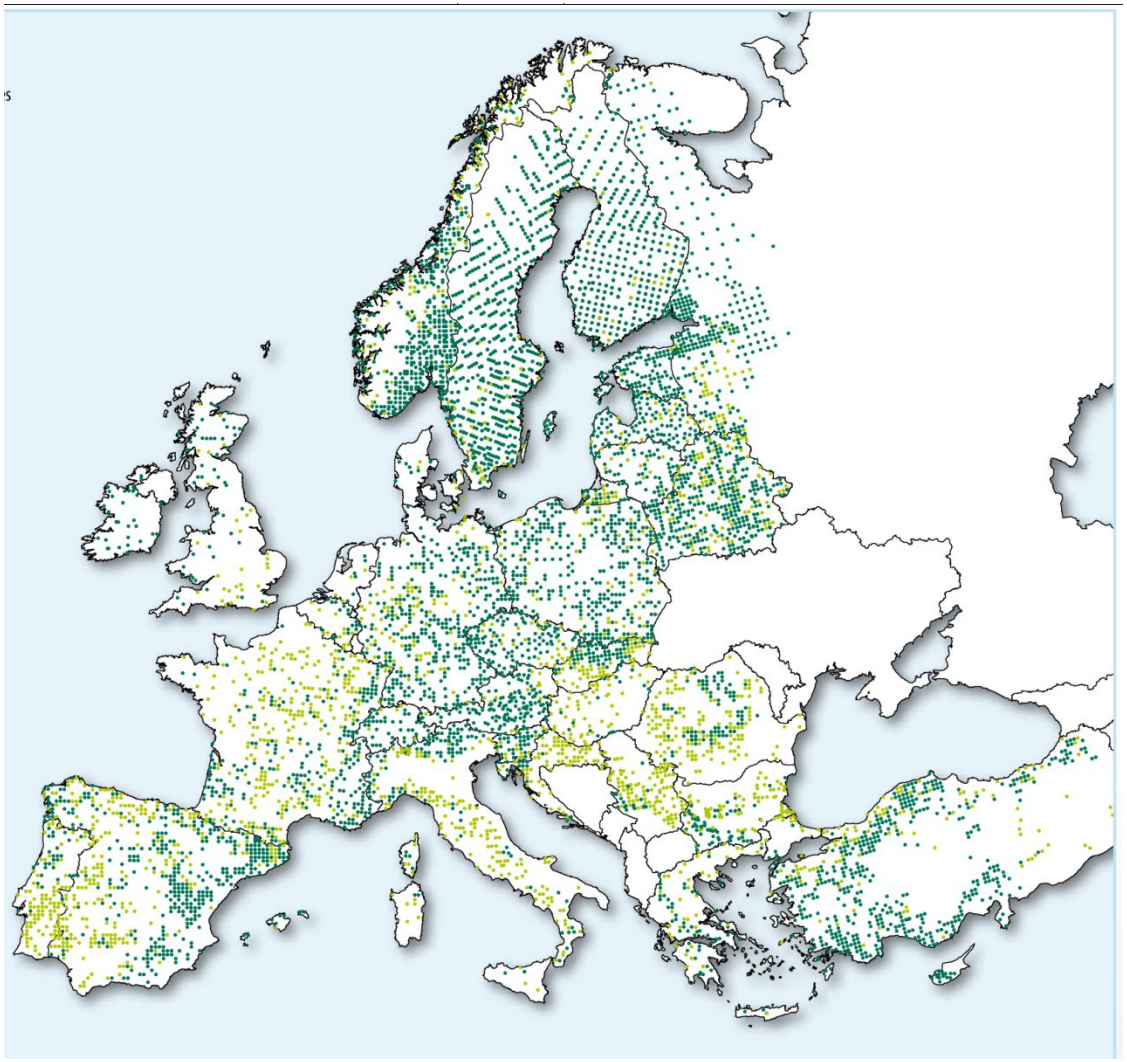
http://www.unece.org/env/lrtap/WorkingGroups/wge/welcome.html

ICP Forests

ICP Forests means ICP on Assessment and Monitoring of Air Pollution Effects on Forests, led by Germany. The mandate of ICP Forests is to monitor effects of air pollution as well as other anthropogenic and natural stress factors on the condition and development of forests in Europe and to contribute to a better understanding of cause-effect relationships in forest ecosystem functioning in various parts of Europe.

Its Programme Centre is with the Federal Research Centre for Forestry and Forest Products, in Hamburg,

More info at:http://www.icp-forests.org/



Level I

About 6800 plots

- Coincident with NFI plots
- Information on
  - Tree health
  - Biotic/abiotic damage
  - Forest growth
  - Ground vegetation
  - ➔ Biodiversity
  - ➔ Carbon pools

System still growing

- Turkey
- Russia
- Contacts with the US

ICP Waters

ICP Waters means ICP on Assessment and Monitoring of Effects of Air Pollution on Rivers and Lakes, led by Norway. The objectives for ICP Waters are to assess, on a regional basis, the degree and geographical extent of the effects of atmospheric pollution, in particular acidification of surface waters. The data collected should provide information on dose-response relationships under different conditions and describe and evaluate long-term trends and variation in aquatic chemistry and biota attributable to atmospheric pollution.

Its Programme Centre is the Norwegian Institute for Water Research, Oslo.

More info at: http://www.icp-waters.no/

Status of participation September 2009

Austria
Belarus
Canada
Croatia
Czech Rep.
Estonia
Finland
France
Germany
Hungary
Italy
Ireland
Latvia
Netherlands
Norway
Poland
Russia
Slovakia
Slovenia
Spain
Switzerland
Sweden
UK
USA

24 countries

Welcome to ICP Waters 25th Task Force meeting Burlington, Ontario, Canada October 19.-21. 2009

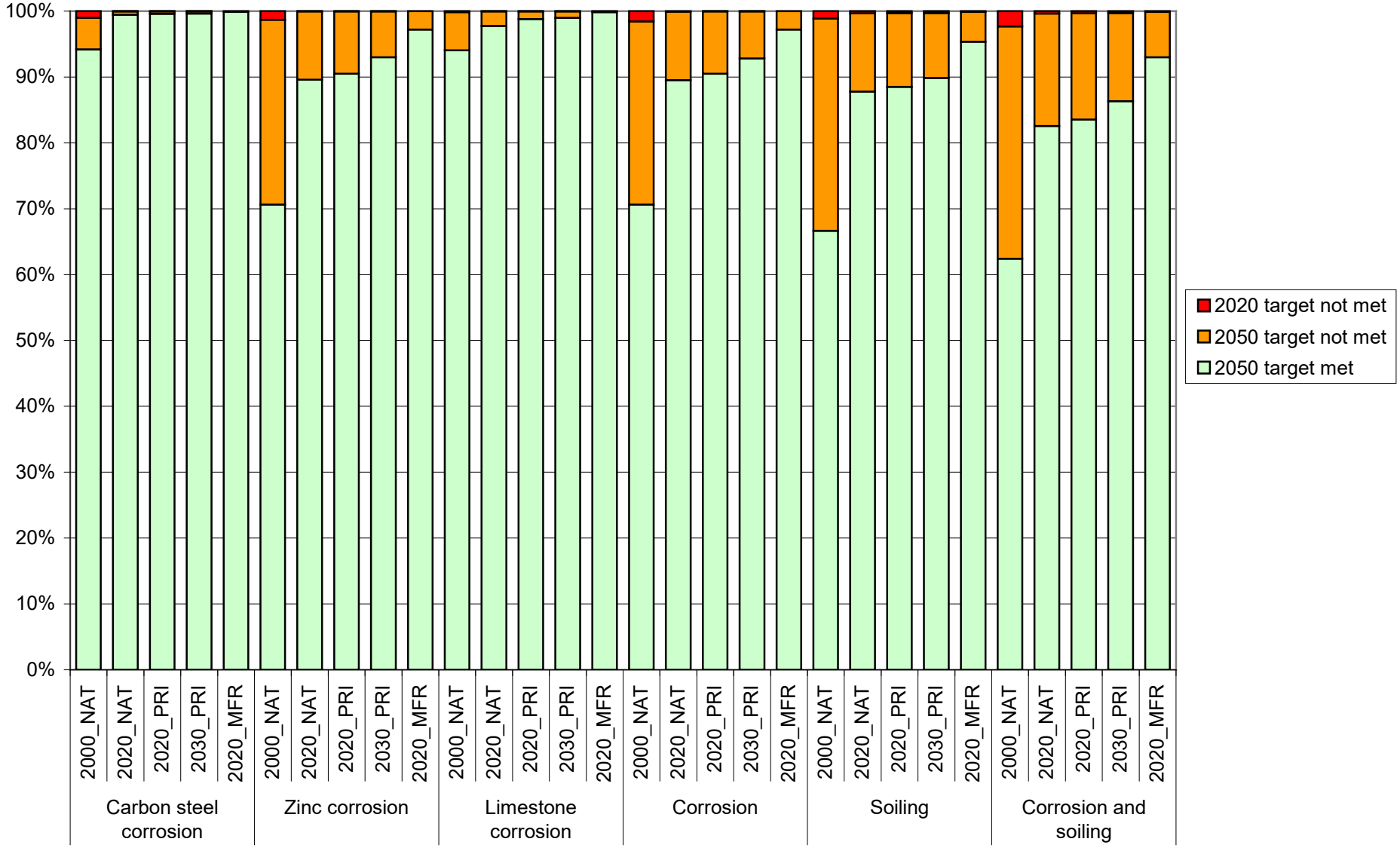
ICP Materials

ICP Materials means ICP on Effects of Air Pollution on Materials, including Historic and Cultural Monuments, led by Italy and Sweden. The objective of ICP Materials is to perform a quantitative evaluation of the effect of sulphur and nitrogen compounds and other major pollutants on the atmospheric corrosion of important materials. The quantitative evaluation aims at determining dose-response relationships as a basis for assessing critical and/or target levels and calculating costs due to material damage.

Its Programme Centre is with the Corrosion and Metals Research Institute, Stockholm

More info at:
http://www.corr-institute.se/ICP-Materials/web/page.aspx

EMEP50 grids exceeding targets

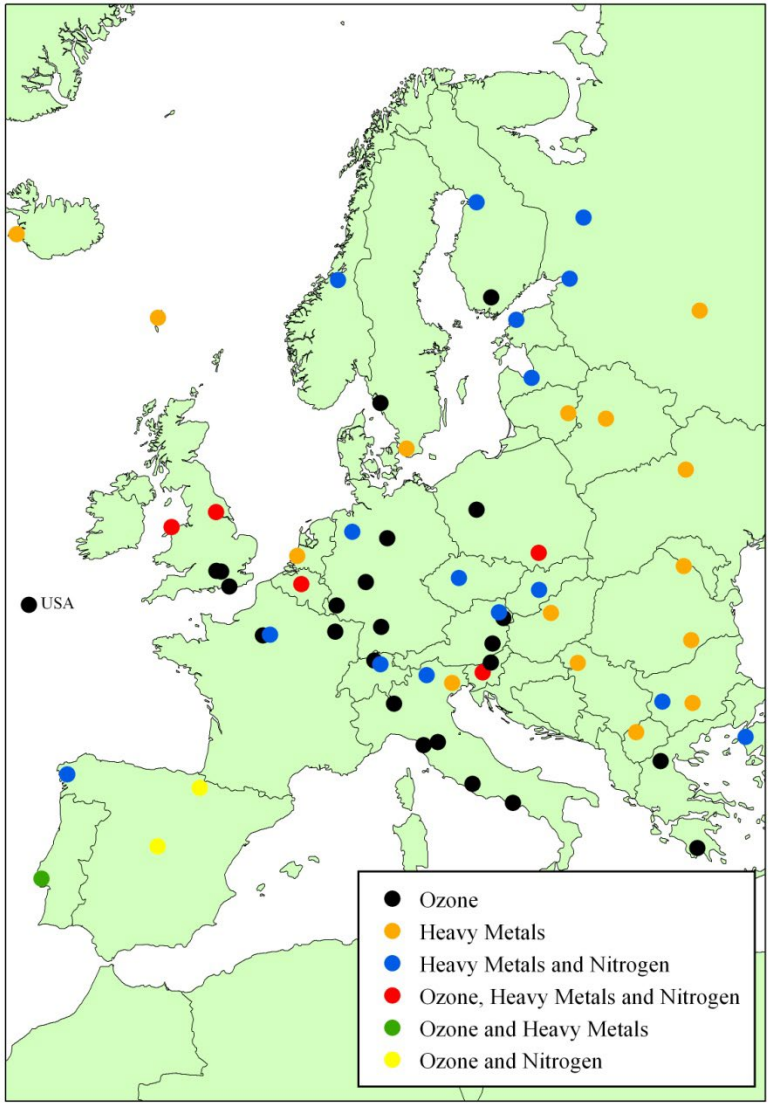


ICP Vegetation

ICP Vegetation means ICP on Effects of Air Pollution on Natural Vegetation and Crops. The objectives of the ICP Vegetation are to evaluate the effects of air pollutants, identify realistic dose-response functions, validate and substantiate critical levels of ozone for crops and non-wood plants, facilitate the production of European ozone exceedance maps.

Its Programme Centre is with the Centre for Ecology and Hydrology, Bangor, United Kingdom

More info at: http://icpvegetation.ceh.ac.uk/



Participation

- 35 countries in ECE region + South Africa
- EECCA: Belarus, Russian Federation, Ukraine
- Links with Asia: Air Pollution Crops Effect Network
  - past – RAPIDC
  - future – GAP forum??

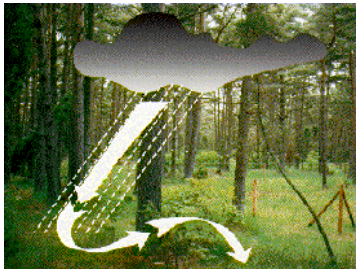
ICP Integrated Monitoring

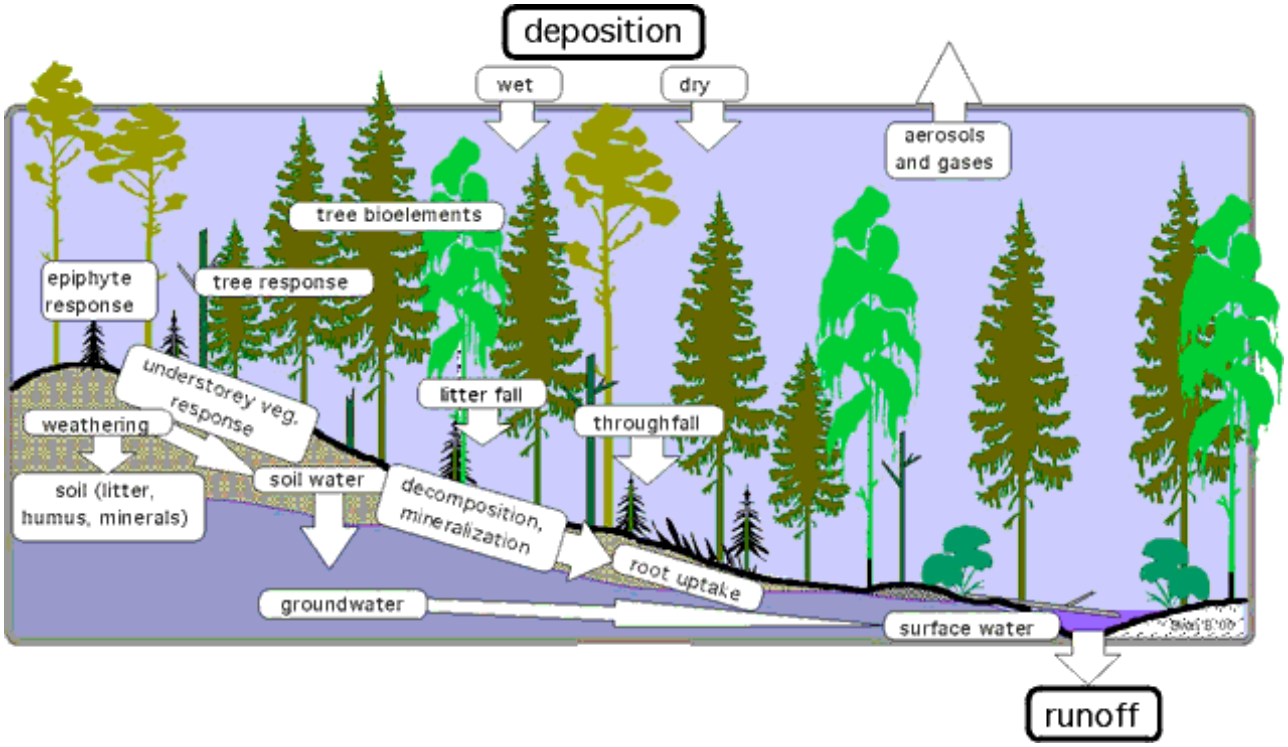
ICP Integrated Monitoring means ICP on Integrated Monitoring of Air Pollution Effects on Ecosystems led by Sweden. The objective of the ICP Integrated Monitoring is to determine and predict of the state of ecosystems (or catchments) and their changes from a long-term perspective with respect to the regional variation and effect of air pollutants, especially nitrogen, sulphur, ozone, and metals, and including effects on biota. Investigations of air pollutants acting on particular receptors have shown that an integrated approach is needed to understand the mechanisms of damage and the resulting effects.

Its Programme Centre is with the Finnish Environment Institute, Helsinki.

More info at:
http://www.environment.fi/default.asp?contentid=361570&lan=EN/

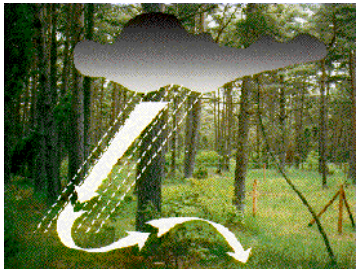
The Integrated IM





Catchment approach
Budget calculations
Process oriented

The Integrated Monitoring sites



TF 14 countries

IR, PL, DE, NL

New interests

50 sites

43 active

LRTAP
Long-range Transboundary Air Pollution

Joint Expert Group on Dynamic Modelling

The Joint Expert Group on Dynamic Modelling is led by the United Kingdom and Sweden. An objective of the Joint Expert Group on Dynamic Modelling is to facilitate collaboration with ICPs by bringing together experts in the field of dynamic modelling of biogeochemical processes in terrestrial and aquatic ecosystems to share knowledge, produce joint reports on all aspects of dynamic modelling, and provide advisory support on the use of these models in individual programmes.

More info at:
http://http://www.ivl.se/en/
http://www.ceh.ac.uk/

Task Force on Health

Task Force on Health Aspects of LRTAP and the World Health Organization (WHO), led by WHO European Centre for Environment and Health (ECEH), in Bonn, Germany. The objective is to assess the health effects of long-range transboundary air pollution and provide supporting documentation. Assessments aim to quantify the contribution of transboundary air pollution to human health risks and help define priorities for guiding future monitoring and abatement strategies. The work of the Task Force is based on estimates of air pollution concentrations, in particular those derived by the EMEP Programme, and on the results of hazard assessment performed by WHO (e.g. in the scope of the revision of the WHO *Air Quality Guidelines*).

More info at: http://www.euro.who.int/air

Participating countries / parties

1. Armenia
2. Azerbaijan
3. Belarus
4. Belgium
5. Canada
6. Czech Rep.
7. Finland
8. France
9. Georgia
10. Germany
11. Ireland
12. Moldova
13. Netherlands
14. Norway
15. Poland
16. Sweden
17. Switzerland
18. United States of America
19. European Commission

Temporary advisers

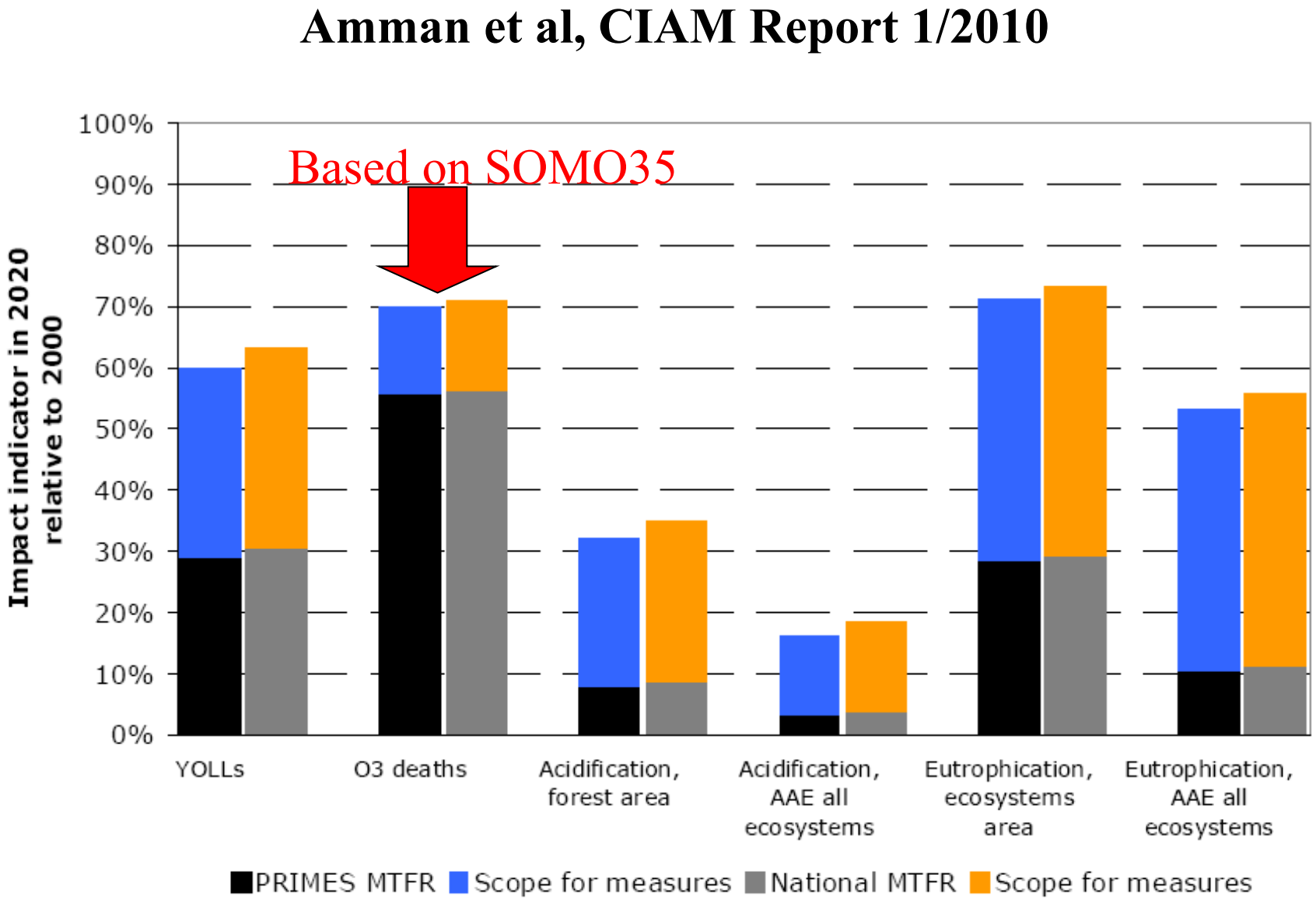
Turkey, UK,
IIASA

WHO / Euro /ECEH Bonn

WORLD HEALTH ORGANIZATION EUROPE

LRTAP Long-range Transboundary Air Pollution

Impact indicators in 2020 vs. levels in 2000, for the baseline cases and the maximum technical feasible reductions (MTFR)



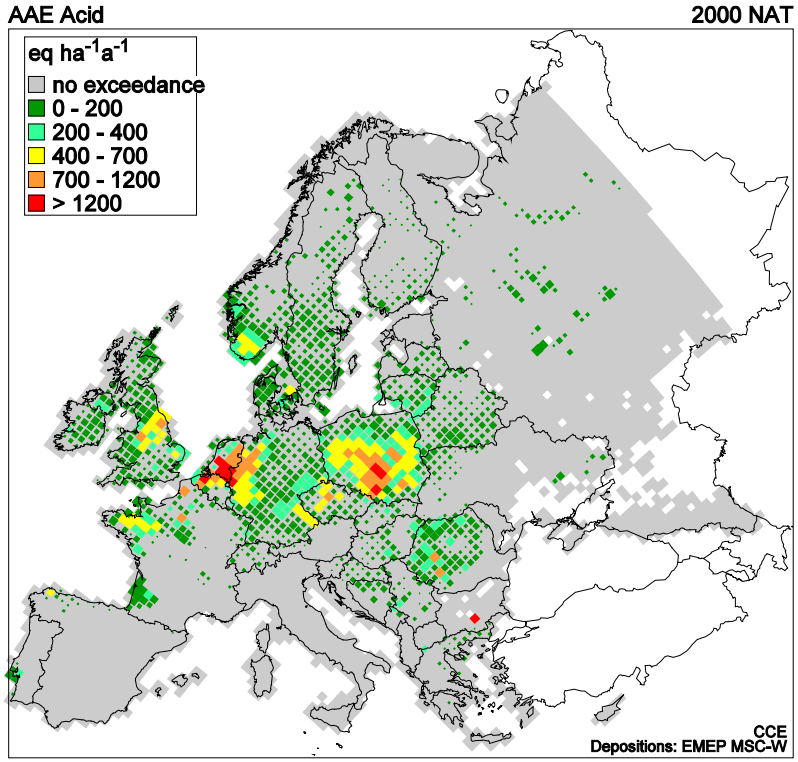
WORLD HEALTH ORGANIZATION EUROPE

ICP Modelling and Mapping

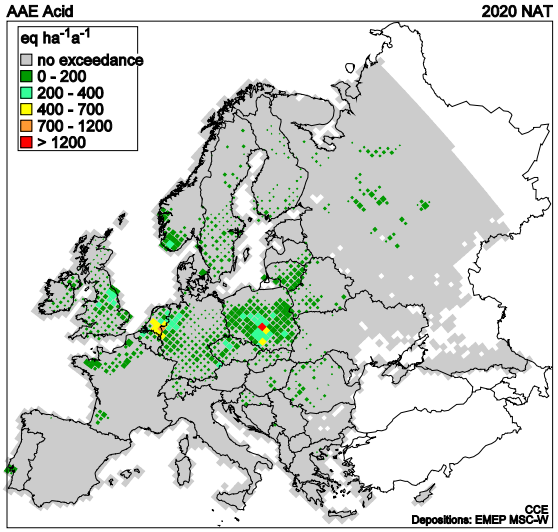
ICP Modelling and Mapping means ICP on Modelling and Mapping of Critical Loads and Critical Levels and their Air Pollution Effects, Risks and Trends led by France. The objectives of the ICP MM include the assessment of damage to forests, crops, natural vegetation, soils, surface and ground waters, and materials by determining critical thresholds, critical loads and critical levels for the response of these systems and to map geographical areas to determine the scope and extent of pollutant depositions/concentr. which exceed critical levels/loads. Its Coordination Centre for Effects, at RIVM in Bilthoven, the Netherlands, develops modelling and mapping methodologies, including calls for data for the assessment of critical loads and exceedance on a European scale.

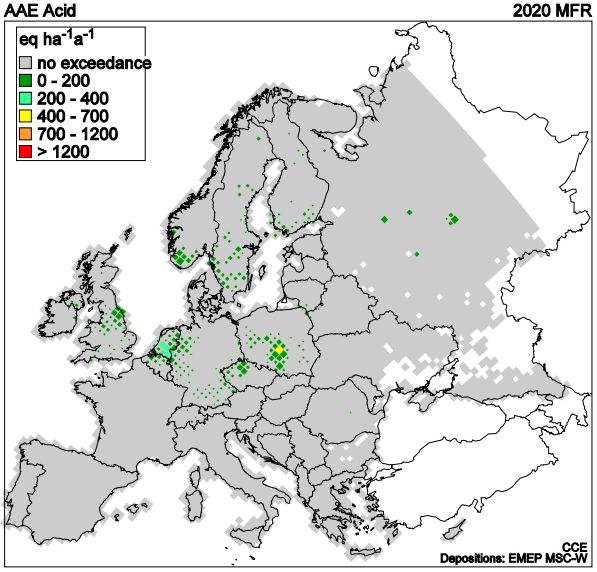
More info at: http://www.icpmapping.org

Risk of acidification:



Baseline 2000





Baseline 2020

Exceedances:

Crit. lds: 3%

Vrs. 2000:

Δ AAE: - 82%

MFR 2020

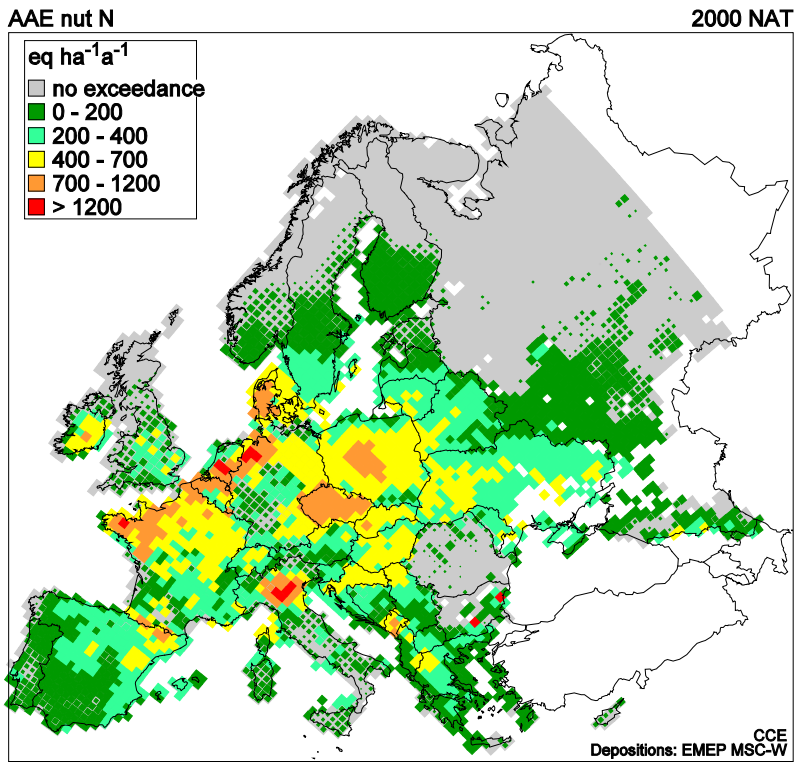
Exceedances:

Crit.lds: 1 %

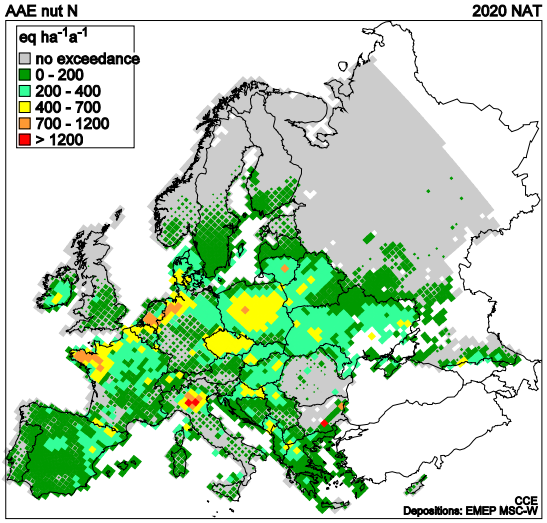
Target lds: 3%

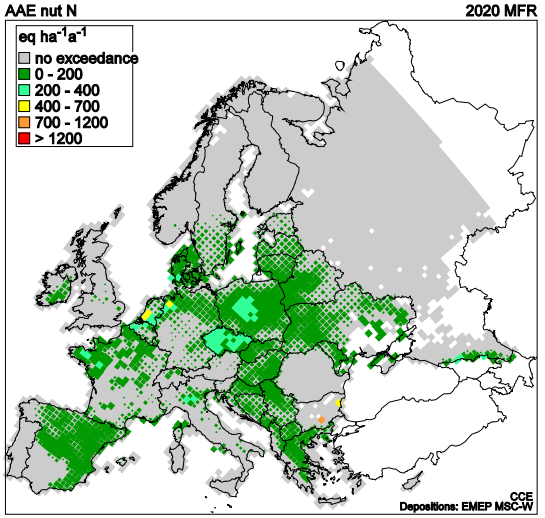
Vrs 2000:

Risk of nutrient N:



Baseline 2000:
Exceedances:
Crit.lds: 39%





Baseline 2020

Exceedance:
Crit. lds: 28%

Damaged: 43%

Vrs. 2000:
MFR 2020
Δ AAE 16%

Exceedances:
Crit lds: 10%
Target lds: 11 %

Damaged: 21%

A multi-pollutant/multi-effect problem (1999)

	SO_2	NO_x	NH_3	VOC
Acidification	√	√	√	
Eutrophication		√	√	
Ground-level ozone		√		√

Extension of the GAINS multi-pollutant/multi-effect framework to include near-term climate impacts (2011)

	PM (BC, OC)	SO_2	NO_x	VOC	NH_3	CO	CO_2	CH_4	N_2O	HFCs PFCs SF_6
Health impacts: PM (Loss in life expectancy)	√	√	√	√	√					
O_3 (Premature mortality)			√	√		√		√		
Vegetation damage: O_3 (AOT40/fluxes)			√	√		√		√		
Acidification (Excess of critical loads)		√	√		√					
Eutrophication (Excess of critical loads)			√		√					
Climate impacts: Long-term (GWP100)							√	√	√	√
Near-term forcing (in Europe and global mean forcing)	√	√	√	√	√	√				
Black Carbon deposition to the Arctic	√									

Working Group on Effects – examples of outreach activities

ICP Forests - EANET

ICP Waters – chemical inter-comparison, five laboratories from Asia, China, Indonesia (2) and Thailand (2)

ICP Materials - RAPIDC (Regional Air Pollution in developing Countries, MALÉ Declaration (Small Island Developing States)

ICP M&M – China (application of critical loads SO2, NOx)

ICP Vegetation – APINA (Air Pollution Information Network in Africa), MALÉ Declaration through APCEN (Air Pollution Crops Effect Network lead by SEI in York

TF Health – MALÉ Declaration, global outreach

Thank you very much!

For further information:

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and Ms. Albena Karadjova - head of the LRTAP Secretariat
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http://www.unece.org/env/lrtap/lrtap_h1.htm