

ICP Modelling and Mapping CCE

2015 results and 2016 outlook

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The 2014-2015 call for data was an opportunity to upgrade national and European databases and adapt to EMEP $\frac{1}{2}^\circ \times \frac{1}{4}^\circ$ longitude – latitude deposition grid

Critical load for N deposition may be:

- Modelled $\Rightarrow CL_{nut}$
- Derived from empirical observations $\Rightarrow CL_{emp}$
- With a conservative approach:

$$CL_{eut} = \{ CL_{nut}; CL_{emp}; ; \min (CL_{nut}, CL_{emp}) \}$$

Unless otherwise requested by NFCs/countries, CL_{eut} will be used for integrated assessment modelling

13 countries submitted updated critical loads

	Acidification	Biodiv.	Empirical	Nutrient
Austria (AT)	😊		😊	😊
Belgium (BE)*	😊		😊	😊
Czech Republic (CZ)	😊		😊	😊
Finland (FI)			😊	
France (FR)	😊		😊	😊
Germany (DE)	😊	😊	😊	😊
Italy (IT)	😊			😊
Netherlands (NL)	😊			😊
Norway (NO)	😊		😊	
Poland (PL)	😊		😊	😊
Sweden (SE)	😊		😊	
Switzerland (CH)	😊		😊	😊
United Kingdom (GB)	😊	😊	😊	😊
Total (13 countries)	1 343 549	554 020	1 063 174	1 073 658

Total submissions 12 2 11 10

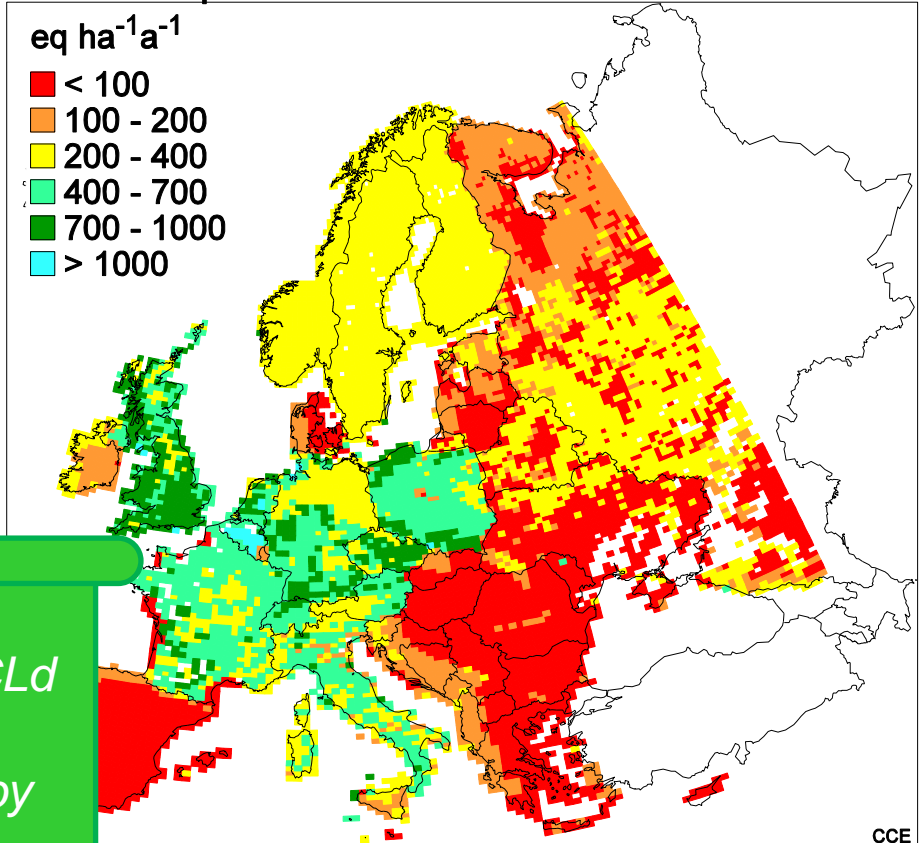
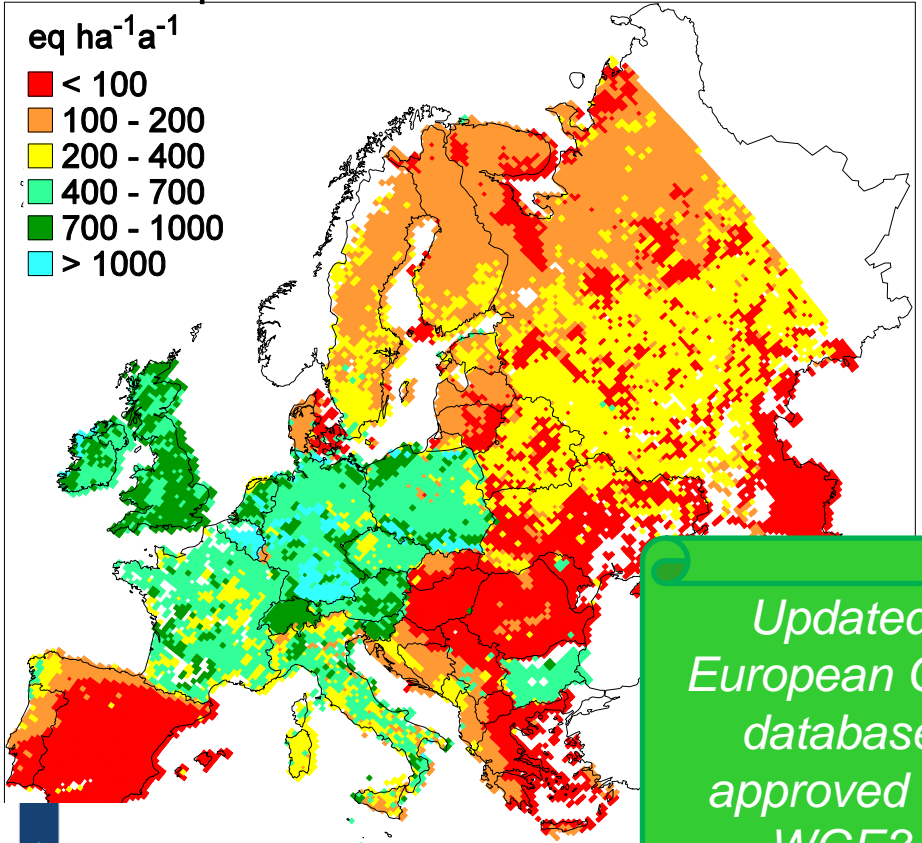
More sensitive in e.g. Austria, France, Germany, Ireland, Switzerland. Less sensitive in e.g. Finland, Sweden

OLD CL database in GAINS

NEW CL database in GAINS

CLnutN 5thperc. 2012

CLeutN 5thperc. 2015



Updated European CLd database approved by WGE?

Objectives for biodiversity Critical Loads

1. To make operational new critical thresholds for the GAINS assessment of adverse effects of air pollution abatement scenarios (incl. under climate change) on plant species diversity and ecosystem services
2. To provide operational indicators for the support of policy with the assessment of scenario-specific adverse effects
3. To analyse the robustness, the magnitude and location of scenario specific adverse effects on a regional scale
4. Develop a common modelling and monitoring framework for biodiversity indicators

Workplan 2014-2015: item 1.2.1

Workplan 2016-2017: item B.1.2.1

CL_{bio} based on Habitat Suitability (HS) index of typical/desired species

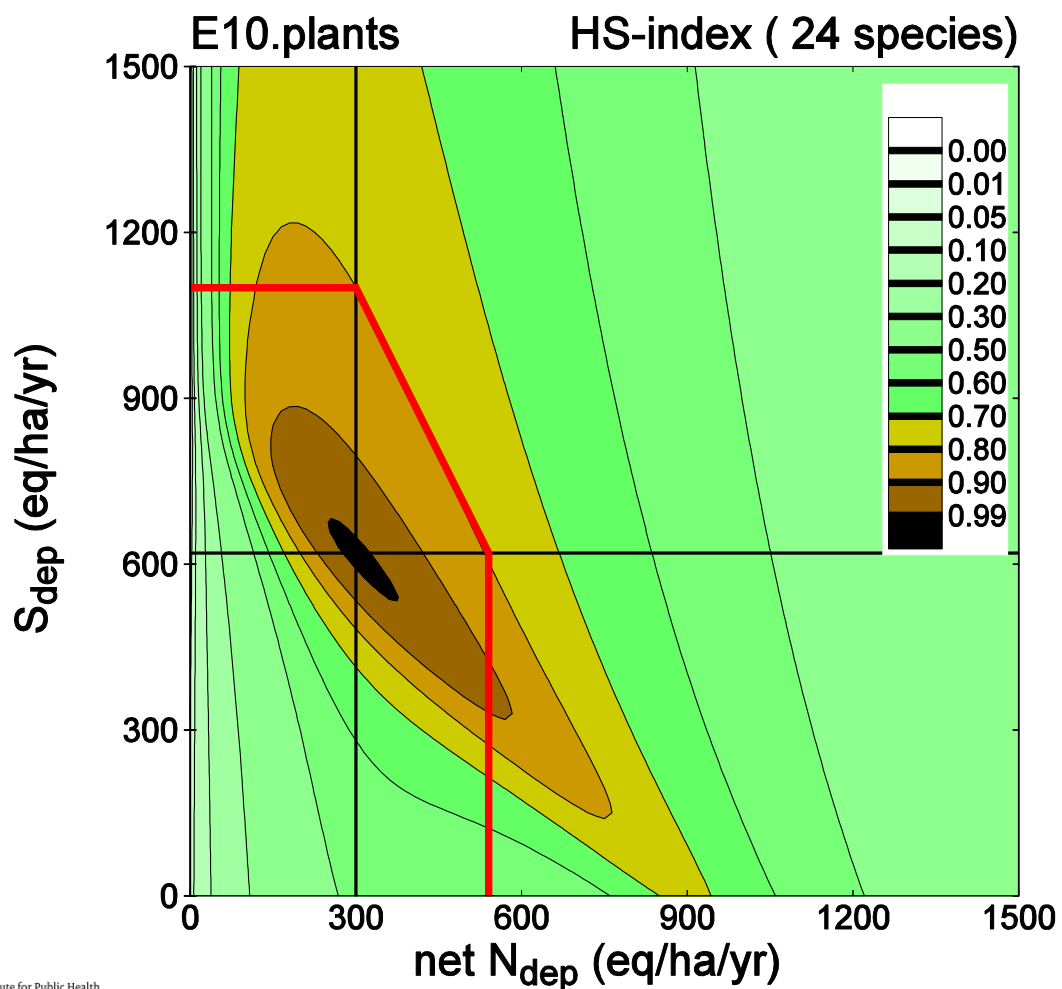
$$HS = \frac{1}{n} \sum_{j=1}^n \frac{p_j}{p_{j,max}}$$

n = number of species (1.3 million datapoints)

p_j = occurrence probability of species j (obtained by observation or, on a large spatial scale, by soil/vegetation modelling, PROPS)

p_{j,max} = maximum of p_j

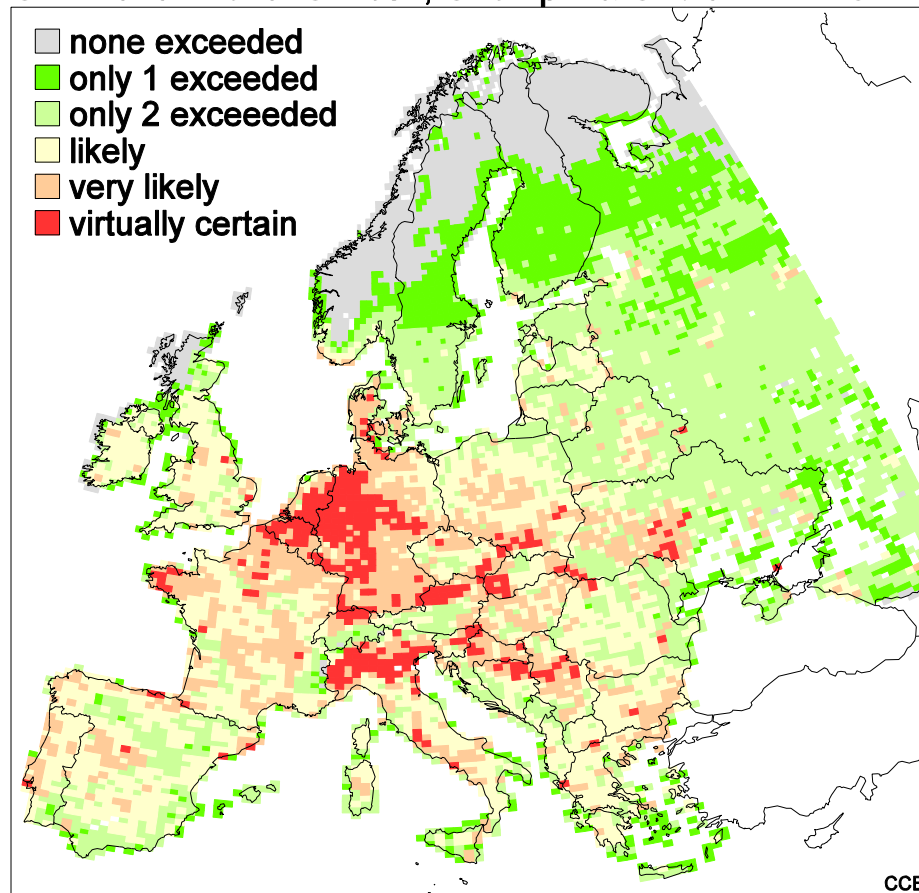
Habitat Suitability Index depends on S and N depositions which allow to derive critical load functions



- To derive a critical load function:
1. Start at maximum HSI
 2. Go 'down' to (e.g.) 80%
 3. Connect with N_{dep} & S_{dep} axes

Exceedance robustness is derived from CLnut, CLemp and CLbio

CLE-2010 Exc. of CLnutN, CLempN & CLbioN EU-DB



CCE

Workplan 2014-2015: item 1.2.1

Conclusions and recommendations on CLbio

Critical loads for biodiversity, Cl_{bio} , are generally higher than empirical critical loads, Cl_{emp} , and critical loads for eutrophication, Cl_{nut} ,

Exceedances occur in all European countries (in particular in EU28), irrespective of the type of critical loads used; magnitudes vary.

Ecosystem health is at risk, but knowledge on actual impacts on “typical habitat species” needs to be further investigated/’verified’ in collaboration between monitoring and modelling ICPs.

Proposal: A new call for data to continue the collaborative development of biodiversity based critical loads

ICP M&M work relies on long term observations and monitoring (more than 3 years...), carried out, in particular, by other ICPs

- Provide dose response relationships
- Data for calibration and validation
- Need for data in some regions of the UNECE

A 2015-2017 call for data requested by WGE?

Next step

- To be used for research purposes (e.g. Eclairé programme) but not (yet) for policy development and analysis
- Call for data 2015-2017:
 - Allows sufficient time for NFCs for their research developments
 - Interim report in 2016
 - NFCs are encouraged to develop their work in collaboration with other NFCs (from other ICPs and from other countries)



Simultaneous impacts of ozone and nitrogen on vegetation may decrease plant diversity

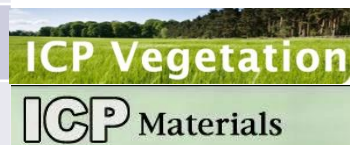
Result of a joint session between ICP M&M and ICP Vegetation

- Results from Switzerland, UK, Spain, ICP Vegetation and/in Eclairé programme
- Evidence of effects of O₃ and N on ecosystems
 - Effects depend on O₃ and N levels
 - At high levels, O₃ mitigates N effects (depends on species)
 - The presence of both pollutants modifies some processes in plant (storage, organic matter cycling...)
 - Plant diversity (e.g. species richness, phylogenetic diversity), and ecosystem services, are modified

Update of the Mapping Manual

Updated versions of the 8 chapters prepared and available as informal documents and on http://icpmapping.org/Mapping_Manual

Chapter		pp
I	Introduction	17
II	Guidance on mapping concentrations levels and deposition levels	33
III	Mapping critical levels for vegetation	138
IV	Mapping of effects on materials	20
V	Mapping critical loads on ecosystems	103
VI	Dynamic modeling	40
VII	Exceedance calculations	12
VIII	General mapping issues	22
Total		385 pages



Update of the Mapping Manual raised discussions points between NFCs

NFCs have reviewed the 8 chapters of the updated Mapping Manual

- Minor points (typos, errors) have been modified in the version now on-line
- Some points have been discussed and solved
 - Short term NH3 critical levels
- Methodological changes are tackled by groups of experts and will be presented for discussion at the 2016 ICP M&M Task Force so that a consensus is reached

- Acceptable leaching of nitrogen
- AI Criteria: Critical Bc/AI
- Weathering
- Critical base saturation
- Nitrogen immobilisation

Switzerland and selected experts

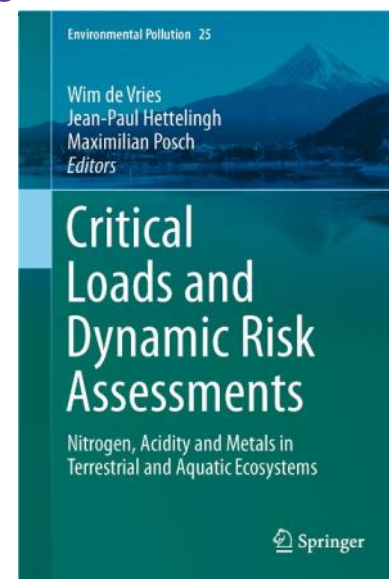
Germany and selected experts

*Approval by
WGE?*

Translation into Russian to be organised by Secretariat when document finalised (as post meeting documents of a EB meeting)

Collaborations at ICP M&M

- Provided information to EU for the revision of the NEC directive
- Collaboration with China is on-going
- Effective collaboration with USA
- Participation of EECCA countries to ICP M&M and CCE WS low due to lack of funding
- Collaboration with other ICPs and with EMEP on going, often at NFCs levels
- ICP M&M contributes to the FP7 Eclairé research programme (and reverse)
- Collaborations around the world lead to the book with applications at local and regional scales in Europe, Asia and North America.



Work plan item 1.8.3

Work plan item 1.1.10

Annual meetings: The ICP M&M Task Force and CCE workshop

2015: in Zagreb, Croatia

2015 workplan: item 1.8.3

- 52 delegates from 19 countries: share questions and results
- Common session with ICP Vegetation
- Common session with the ECLAIRE Programme
- Training session for NFCs on dynamic soil vegetation modelling

2016: in



2016-2017 workplan: items
A.1.1.1.21
B.1.1.6, 1.2.1, 1.8.1, 1.8.4

Overall, results from ICP M&M show that...

Exceedances from acidification have markedly decreased since 1980 but still cover 5% of all ecosystems and about 10 % of aquatic ecosystems (for which data is available)

Exceedances from eutrophication covered about 60 % of European ecosystems

Exceedances also remain for lead and mercury (20 % and 56 % respectively)

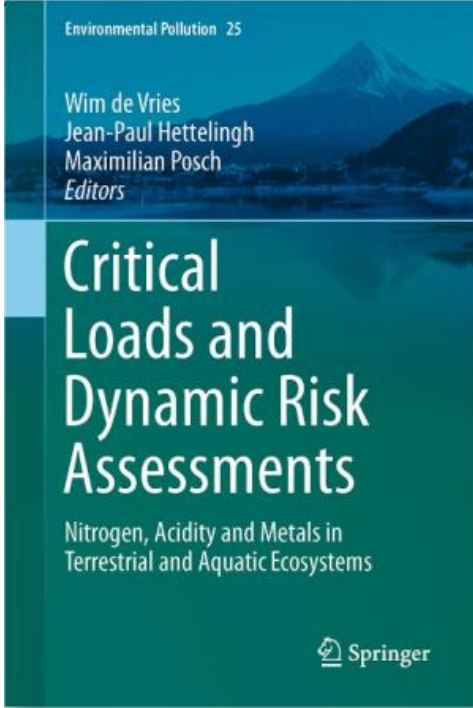
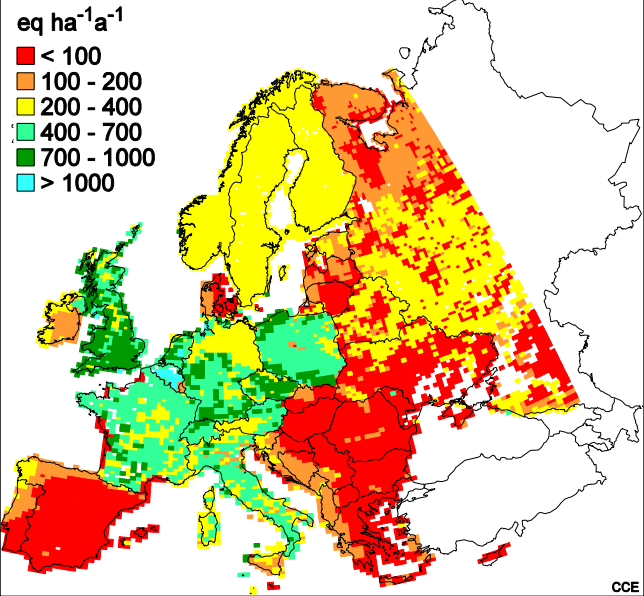
Biodiversity based CLd are being developed to respond to EB requests and needs for nature conservation policy

N and O₃ have combined impacts on vegetation, that depend on concentrations

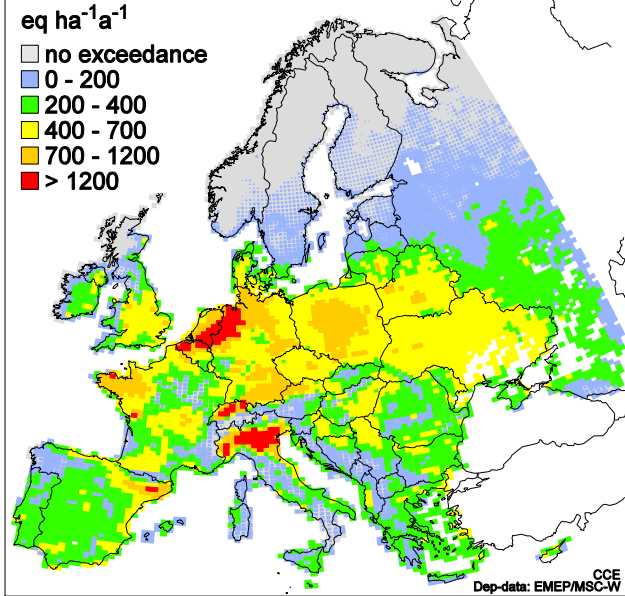
WGE approvals for updated European CLd database, 2015-2017 call for data, Mapping Manual

ICP M&M work will be “seriously restricted” if CCE cannot carry out its coordination tasks for Europe

CLeutN 5thperc. 2015



AAE of CLnutN CLE-2050



**THANK YOU
FOR YOUR ATTENTION**

