

***International Cooperative Programme on Modelling and Mapping  
of Critical Loads and Levels and Air Pollution Effects, Risks and Trends***

***Minutes of the***

***Sub-regional workshop on examination of cross-border consistency  
of critical loads mapping and dynamic modelling results***

**OEKO-DATA Strausberg (Germany) 17-19 October 2011**

**I. Welcome**

Mr Hans-Dieter Nagel (German NFC) welcomed the 10 participants from 5 countries, Austria (AT), Czech Republic (CZ), Germany (DE), Poland (PL) and Romania (RO). He recalled the tradition of Sub-regional meetings as a useful instrument for verifying cross-border consistency of CL results and increasing the reliability of European CL databases. Next he gave an overview on the objectives of the workshop and introduced the agenda for adoption. On behalf of the German Federal Environment Agency Mr Markus Geupel brought a warm welcome and stressed the importance of such meetings for the linkages between scientific and political issues.

**II. Critical Loads of Acidification and Eutrophication – Chair: H.-D. Nagel (NFC DE)**

The chairman of the session stressed that because of the on-going revision of the Gothenburg Protocol the calculations of CL of acidity and nutrient nitrogen are still of high interest within the work of ICP M&M and the WGE. For the next period of work and in preparation of the 2012 CCE workshop and the Task Force meeting of the ICP M&M one important aim is to develop and provide indicators that inform stakeholders about the impacts of atmospheric pollution on ecosystems together with their evolution in time. An important activity will always be the exchange of national datasets between NFCs and the CCE. Therefore the NFCs agreed

- to take part in the 2011-2012 call for data / contribution of the CCE;
- to develop / apply dynamic vegetation - soil chemistry models for national datasets.

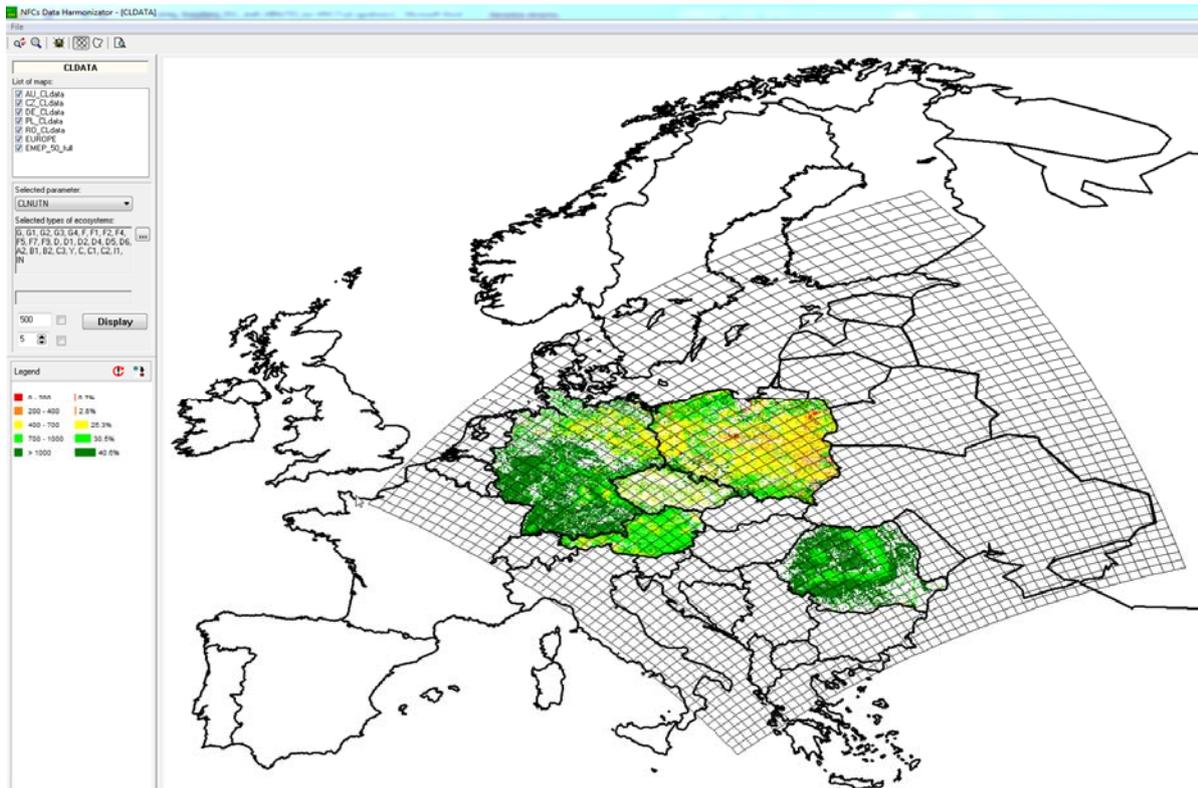
All participating NFCs are engaged to support various activities in the review process of the Gothenburg protocol. In line with the “Long-term strategy for the Convention on Long-range Transboundary Air Pollution and Action Plan for Its Implementation” ([Decision 2010/18 ECE/EB.AIR/106/Add.1](#)) they will take part in the reassessment of the Gothenburg Protocol in terms of its correspondence with the updated scientific effects assessment and the degree to which it has achieved its long-term effects oriented goals. The NFCs are following the strategic priorities and goals for the Convention, especially as given in paragraph V.16.(e) to the strategy.

*Reports of the NFCs and comparison of data:*

Presentations of the current status of input and output databases for critical loads of acidity and eutrophication in the light of the 2010/11 CCE call for data were given by AT, CZ, DE and PL. National data sets and methodologies to derive input data and critical loads of acidity and nutrient nitrogen were discussed. The CL data presented by RO were derived from the national dataset of 2008.

*HARMONIZATOR programme tool: Numerical and graphical judgement of critical loads data in bordering areas; identification of possible systematic biases and uncertainties:*

This tool, developed by the Polish NFC, presents national maps of critical loads and the key input data at their original detailed spatial resolution. Coloured maps, supported with a common legend, give the first image of the magnitude and location of potential inconsistencies in considered critical load values at the borders (see below).



The basic comparison areas are 50x50 km<sup>2</sup> EMEP grid cells covering the model domain comprising the considered countries with a focus on the bordering zones. For each selected grid cell a basic statistics, histograms and cumulative distribution functions for neighbouring countries data are provided. Identifying an unacceptable difference in critical load values one can inspect the relevant input parameters by graphical comparisons and numerical examination of the national databases which are made accessible by the model.

The comparison was made on the basis of the data submitted to the Coordination Centre for Effects in response to the call for data from November 2010 (data submission to the CCE March 2011).

The comparison procedure results summarized in the following:

- in general harmonized data due to the application of methods described in the Mapping Manual;
- some differences caused by different ecosystems / receptors (e.g. at the Polish / German border)

- for some input parameter national approaches were applied,
  - Nle(acc): [AT] between 4 kg N ha<sup>-1</sup> a<sup>-1</sup> (500 m a.s.l.) and 2 kg N ha<sup>-1</sup> a<sup>-1</sup> at 2000 m a.s.l. (see NFC report in CCE 2008)
  - [CZ] constant value of 1.5 mg N/l
  - [DE] range given in the Mapping Manual depending from duration of the vegetation period (see NFC report in CCE 2007)
  - [PL]
- Nu: [AT] and [PL] actual harvesting data from Forest Inventory
- [DE] potential long term growth rate at the sites (historical growth rate tables from pristine sites)
- Ni: all NFC temperature depending according to the following table:

Mean yearly temperature [° C]	N-Immobilisation rate	
	[kg N ha <sup>-1</sup> a <sup>-1</sup> ]	[eq ha <sup>-1</sup> a <sup>-1</sup> ]
<5	5	357
5	4	286
6	3	214
7	2	143
8	1,5	107
>8	1	71

[CZ] additional criteria: if C:N < 20 then Ni=0

The proposal for calculating the immobilisation rate given in the last manual revision “the immobilisation rate is higher in warmer regions” doesn’t scores the experiences of the NFC’s.

### **Conclusions:**

All participants expressed their gratitude to the Polish NFC for the development of the HARMONIZATOR model tool. The NFCs agreed to suggest the presentation of this software and selected cross-border analyses at the next CCE and TF M&M meeting in April 2012 in Warszawa.

Differences in national datasets will be checked for further work and if necessary changed by NFCs. For that the tool in its current version including the national data had kindly been distributed from NFC Poland to the other attending NFCs.

### III. **Dynamic Modelling – Chair: T. Pecka (NFC PL)**

#### Presentation of the current status of dynamic modelling of geochemical soil parameters in the light of the 2010/11 CCE call for data (VSD+)

The NFCs of AT, CZ, DE, PL and RO provided an overview of their dynamic modelling efforts in response to the recent call for data of the CCE. The focus of NFCs in VSD+ model application is as follows

AT: 7 plots at LTER area, cooperation with ICP IM

CZ: ICP Forests Level II plots (in preparation)

DE: 16 ICP Forests Level II plots (9 broadleaf, 6 spruce and 1 pine), cover different soil, climate and deposition conditions

PL: 5 ICP Forests Level II plots, all pine on sandy soils, comparable abiotic and biotic conditions

RO: ICP Forests Level II plots (in preparation)

#### **Conclusion:**

The dynamic geochemical model VSD+ will be used by all participating NFC also in future to assess the effects of deposition scenarios and climate change. They expressed their gratitude to the Coordination Centre for Effects (CCE) for providing this software to the NFCs. With the forthcoming call for data / contributions further improvements of the model are expected.

The NFCs agreed to focus their activities to increase the reliability of model results and interpretation instead to expand the locations. An evaluation of the MetHyd model compared with meteorological data in Poland led to the suggestion of a careful model use.

### IV. **Modelling and assessment of the biological response to deposition and climate change – Chair: T. Scheuschner (NFC DE) & I. Skorepova (NFC CZ)**

#### Summary of advance made by individual NFCs modelling the biological response to deposition and climate change

All NFCs will use or used already VSD+ results for combining with biological models. Experiences of these modelling approaches are presented for

a combination of VSD+ and VEG (AT, PL) and

a combination of VSD+ with BERN (DE).

Further bilateral cooperation to compare models / model results will continue (AT/DE and DE/PL) and support for those NFCs starting with dynamic modelling (CZ, RO) was offered.

### **Conclusion**

The participating NFCs stressed the need to compare and test the different biological models. Therefore they recommended to create an European geochemical set of test sites (VSD+) by the CCE. The NFCs of AT, DE and PL offer to submit e.g. one representative VSD+ test site for each country to feed biological models for a model comparison.

### **Exchange of experience in evaluation of empirical critical loads of nitrogen**

The NFCs applied empirical critical loads on nitrogen as follows:

AT: lower value of the empirical critical load range

CZ: deriving empirical critical loads for 7 small catchment areas

DE: lower value of the empirical critical load range

PL: deriving modifying factors at national level and applying these to CLempN

RO: deriving empirical critical loads for acidification at 2 Level II plots

### **Conclusion**

The participating NFCs prefer for policy issues and national use of critical loads the mass balance calculation. Empirical critical loads could be a helpful addition for NATURA 2000 areas and those nature protection fields without a sufficient database for modelling.

## **V. Final discussion and conclusions / general issues – Chair: H.-D. Nagel (NFC DE)**

- The chair of the session thanked all NFCs for their reports and data delivery, as well as for ideas and active participation in the discussion;
- The results of the comparison exercises for CL and dynamic modelling data carried out during this workshop offering a basis for better submissions quality to the next CCE call for data and more credible data for national purposes;
- The HARMONIZATOR tools for cross border data comparison provided by Polish NFC have proved successful and were highly acknowledged by all participants. It was decided to equip with them all the participating NFCs; the model tool should be presented to scientific community during the next TF meeting and CCE workshop;
- The NFCs stressed the importance of sub-regional meetings especially for neighbouring countries for data exchange (including deposition data near boundaries), improvement of national approaches and scientific cooperation;
- The NFC's agreed that the minutes of the meeting are provided for information to the relevant bodies of the Convention (WGE, TF Modelling and Mapping, CCE) as well as to the national ministries.
- The NFCs of Austria, Czech Republic, Poland and Romania thanked the German NFC for the organization of the Sub-regional workshop in Strausberg and all participants agreed to organize a next Sub-regional meeting.