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CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

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

ANNEX 2: TOUR DE TABLE

22nd CCE Workshop and the 28th meeting of the Programme Task Force

16th-19th April 2012 in Warsaw, Poland

During session 4, a tour de table offered each National Focal Centre (NFC) the opportunity to rapidly present activities in their country. It highlighted the following points:

Austria:

The NFC has changed its team: Thomas Dirnböck followed Erik Obersteiner as the responsible person at the Austrian Environment Agency. The last critical load (CLd) update for acidification and eutrophication (SMB approach and also empirical CLd for eutrophication) dates back to 2011. Dynamic modelling of soil and vegetation is emphasized since 2010 starting with only one site, the ICP Integrated Monitoring station Zöbelboden. This year, collaboration with the NFC for ICP Forests allowed the inclusion of 6 additional sites. For dynamic soil modelling VSD+ is used and for vegetation both VEG and BERN.

The national cooperation within the CLRTAP is well in place due to the fact that most bodies and working groups of ICPs are located at the Environment Agency. Thomas Dirnböck is also responsible for ICP Integrated Monitoring and the Task Force on Reactive Nitrogen. The novel cooperation with the NFC for ICP Forests is particularly appreciated.

The Austrian NFC for ICP M&M is participating in regional workshops such as those with the Czech Republic, Germany and Poland.

Future activities will particularly focus on effects of nitrogen deposition. The current limitation of results to forest ecosystems will be expanded to grassland sites and Natura 2000 areas. Links exists with other conventions (CBD) and networks (e.g LTER Europe).

Azerbaijan:

Azerbaijan has ratified the Convention on Long-range Transboundary Air Pollution in 2002. Its Ministry of Environment and Natural Resources (MENR) is taking comprehensive measures to address environmental issues, including air pollution. At the moment, 70% have air pollution is caused by motor vehicles. However, actions are under way to reach EURO 3 and EURO 4 standards. Euro 5 will be achieved when the modernization of the Baku Oil Refinery is carried out. A background air monitoring station (EMEP level 1) has been set up with the support of Norwegian experts in the National Park Alta-Agach. Data collected at this site has been sent to EMEP.

Bulgaria:

The main topics studied in Bulgaria are acidification monitoring and dynamic modelling. The Bulgarian NFC has also carried out a deposition (S and N) modelling and exceedance experiment. Collaboration with ICP Forests (Level I and Level II - 3 plots) are successful.

There were no new critical levels and loads results, nor new data to respond to the 2011 call for data.

In recent years, acidification is not seen as a major problem in Bulgaria. Effects of nitrogen deposition are studied, using critical loads for nitrogen as an indicator, with a focus on forest ecosystems. Developing research on these issues is limited by low level (or absence of any) of funding. Further work has not been possible because of insufficient funding.

While reviewing its priorities, Environment Bulgaria will determine its level of participation in support of the Convention as the Bulgarian Focal Centre of the ICP M&M.

The Bulgarian NFC will continue to support activities under the Convention, with a proposed focus on biodiversity. Also interactions of air pollution with biodiversity and climate changes will be studied. Efforts will be made to adapt GrowUp tool (uptake prediction) to the forests with “close to nature” management.

Canada:

Environment Canada, like other Canadian federal departments, is undergoing a number of organizational and functional changes in order to continue to deliver on its priorities while contributing to the Government's effort to return to fiscal balance. One of these priorities is to understand the effectiveness of air pollutant regulations in improving and protecting the health of ecosystems from acidification and other stressors. While reviewing its priorities, Environment Canada will determine its level of participation in support of the Convention as the Canadian Focal Centre of the ICP M&M.

China:

The main objective is to improve the air quality for health effects. Sulphur and nitrogen emission have been reduced in China. Acidification is mapped with critical load exceedance, which is an indicator used to monitor air pollution. Eutrophication is a problem but is caused by other sources of nitrogen than air pollution. Interactions of air pollution with biodiversity and climate changes are also studied.

Croatia:

Emissions of air pollutants (SO_2, NOx, NH_3, NMVOC, CO, PMx, heavy metals) were reduced in 2009 in comparison with 1990 in Croatia. The highest reduction was in emissions of Pb (93%), As (85%), SO_2 and Hg (ca. 60%), and the smallest for NOx, PM_{10} and $PM_{2.5}$ (ca. 16%). Within the same period there was an ca.20% increase of particulate matter (TSP) emissions.

According to air quality assessments at a national level in Croatia, performed in 2011 by Croatian Meteorological and Hydrological Service (CMHS), the main air quality issues identified at the country scale are related to particulate matter and ground-level ozone. In 2011 CMHS made a trend analysis of ion's concentration in rainfall for periods from 1981 to 2010 and from 2005 to 2010, both from measurements (18 stations across Croatia) and modelling (EMEP4HR modelling system, 10x10 km^2 resolution). The measurements show decreasing trend in SO_4^{2-}, NO_3^- and NH_4^+ concentration in rainfall, as well as its deposition,

being less pronounced in eastern part of Croatia than elsewhere. On the other hand, no significant decreasing trend in concentration of cations ($Ca^{2+,}$ $Mg^{2+,}$ K^{+}) was found. Since 1980s, the deposition of sulphate ion has decreased from 20-40 kg/ha/yr to 9 kg/ha/yr and nitrate and ammonia from 12 to 14 kg/ha/yr to 9 kg/ha/yr, in average. Deposition of nitrate and ammonia ions has not decreased at high altitude locations (2 EMEP monitoring stations) where no local sources of pollution are present, which infers to the presence of long-range transport of pollution. The effects that should be addressed are health impacts (PMx and ozone), vegetation damage (ozone, eutrophication, metals) and impacts on biodiversity.

Concerning mapping and modelling of critical levels and loads, there were no new results and data for data call 2011, as the activities were slowed down, possibly due to lack of funding. As for the other ICP activities, Forestry Institute (ICP Forests NFC) continuously performed monitoring at Level I and Level II (7) plots.

With the respect to other activities discussions are underway with the Ministry of Environment and Nature Protection so that WGE activities may be supported and further developed, especially as know-how already exists in Croatian institutes, in particular for activities related to ICPM&M.

Czech Republic:

The Czech National Focal Centre is finishing the database for dynamic modelling, including critical loads assessments in 12 forest localities monitored on level II in the framework of the ICP Forests. In future the NFC will continue processing these databases for another 130 forest level I monitoring sites. The empirical critical loads for forest stands and a relevé of vegetation species will be established. The NFC cooperates with habitat and biodiversity experts. We elaborated the indicator no. 9 for the report on the state of biodiversity. We cooperate to the other ICPs but cooperation to the other bodies in the Convention is limited due to reduced funds and related working capacities at present.

Denmark:

Main topics studied are: Update of critical loads and monetizing different sites; Biodiversity under the Habitat Directive. The activity is focused on EU requests rather than LRTAP's.

France:

Main topics studied are: Monitoring acidification; evolution of acidifying potential; dynamic modelling, including the influence of climate change with nitrogen deposition scenarios. Ecological model analysis including a sensitivity analysis of models (ForSafe-Veg, EcoPlant) that showed that soil humidity had a great influence on nitrogen processes; impact of nitrogen on grasslands in the Pyrenees; impacts of antimony in forests soils; lichens investigations; Transposition of EUNIS classification to French ecosystems; Collaboration with Sweden to improve ForSafe and the Veg tables; Define functional groups; Elaboration of a grassland database; ecosystem services and engineering ecology. Collaborations are on going with ICP Forests NFC.

Germany:

The NFC works in close cooperation with the Federal Environmental Agency (UBA). CL updates are computed for eutrophication and acidification according to SMB approach using a national 1x1 km^2 grid and applying a new assessment of acceptable N leaching.

For dynamic modelling (VSD+ model) and assessment of biodiversity effects (BERN model) 2 sites of the ICP IM and 2 Level II plots of the ICP Forests were tested in close cooperation

between both ICPs. Results of different projects are used to fit the critical loads computation to Natura 2000 sites.

As useful effects indicators (biological endpoints) critical loads exceedances and similarity indices (Sorensen index) are suggested. A remaining problem is the definition of ecological protection targets (reference ecosystems).

The linkage of national activities under the CLRTAP is strengthened due to an annual meeting of all national working groups for the ICPs.

Regional NFC workshops of neighbouring countries (Austria, Czech Republic, Germany and Poland) were organized for streamlining and harmonization of data and methods (cf. Annex 2).

The NFC is currently involved in the following projects: 1- Derivation of methods to evaluate ecosystem integrity; 2- Consolidating approaches for effects assessment for O3 on a national scale, comparison of AOT and Flux approach and Sensitivity analysis, to be reported to ICP V; 3- Literature research on empirical critical loads (German studies not yet considered in the 2010 update); two year experiment to derive the empirical critical load for wet heath (coastal dunes). 4- Derivation of Habitat type specific Critical Loads based on the BERN model in the context of site specific assessment of deposition of nutrient nitrogen. The three first projects are funded by UBA while the fourth one is funded by the Federal Highway Research Institute.

Ireland:

During the past year, critical load activities under the Irish NFC have primarily focused on two areas:

> (1) Updating national critical loads for nutrient nitrogen and acidification, incorporating new (higher resolution) spatial data and incorporating data for surface waters. Revised terrestrial and (new) aquatic critical loads will be submitted to the CCE during 2012.
>
> (2) Building capacity and data to support dynamic vegetation modelling. The NFC has supported extensive chemical analysis of soil samples associated with vegetation relevés, and also initiated collaboration with the national agency responsible for Habitat reporting. The NFC responded to the 2011 CCE call for contribution, providing data for four VSD+ modelling sites (ICP Forest long-term monitoring plots).

The Irish NFC has re-activated its participation in ICP Waters, and re-initiated data submission filling the data gaps since the last Irish submission in 1999, and expanding regional coverage and number of lakes submitted to ICP Waters. In addition, the Irish NFC has continued bilateral discussion with the UK NFC to evaluate differences in mapped critical loads.

It is anticipated that the Irish NFC will continue to support activities under the convention, with a proposed focus on dynamic vegetation modelling.

Norway:

Acidification of surface waters is still a problem in Norway. Main activities have been in relation to: Development of dynamic modelling; assessment of eutrophication in surface waters (for instance on empirical critical loads); testing the use of critical loads as a parameter in the Norwegian Nature Index, established to provide an overview of the state and development of biodiversity in the major ecosystems in Norway; communication of obtained

results, particularly on the assessment of the Gothenburg Protocol scenarios. Some persons involved in the NFC exchange with groups under other Conventions.

Poland:

Activities are focused on critical loads database for Natura 2000 including improving land cover and input data for critical loads calculations. Assessment of possible nitrogen effects on the national scale with various S and N deposition scenarios is in progress. Different criteria of atmospheric pollution effects for Natura 2000 species and habitats are considered.

Also already in progress: (1) development of dynamic modelling for forests, involving habitat experts and (2) integrate critical loads database with air pollutants transport model for Poland as the first stage of development of integrated assessment model for Poland. Closer cooperation with TF IAM is planned.

Republic of Moldova:

The Republic of Moldova has been signed the Gothenburg Protocol, but not yet ratified it.

With financial support of the Government of Czech Republic, an Action Plan has been developed on the implementation of the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone in the Republic of Moldova, 2012 – 2020. We are grateful for kind support of Czech Republic and good cooperation with Czech specialists in this issue.

The SO_2 pollution and heavy metals concentration were estimated via non instrumental methods using Bryophyta, Erysiphales and Molluscs in terms of ecobioindication.

Concepts of critical loads set by the Convention on Long-range Transboundary Air Pollution for SO2, NOx and NH3 serve as good basis to evaluate a sustainable ecological balance in the functioning of forest ecosystems in the Republic of Moldova,

The studies done within the frame of the Institute of Ecology and Geography of the Academy of Sciences of Moldova, conclude on the fact that, forest ecosystems of the Republic of Moldova do not have reserves concerning the critical load on SO2 pollution, the annual average of which during the growing season for dendrological species is 0,02mg/m3 while for lichens and cyanobacteria, organisms very sensible to pollution, the reserve is only 0,01mg/m3 . Lichens indication showed that current level of pollution is between 0,05 and 0,5 mg/m3 air for SO2 , thus long-term harmful effects are manifested in all 62 studied forest ecosystems.

Out of 4 tested transplant species, Parmelia sulcata species preponderant in forest ecosystems has provided to be the most responsive to chemical air pollutants, particularly to SO2, recording evident morphological and biochemical changes (changes in color, degradation of thallus, degradation of photosynthetic pigments). This peculiarity allows to transfer the species from toxitoleration class III to class II, and classify it as a standard species in evaluation of SO_2 air pollution.

The Institute of Ecology and Geography proposes the species of lichen Parmelia sulcata as a standard species used as bioindicator of air pollution in several countries.

Moldova is involved in ICP forest monitoring, using the characteristics of defoliation level in broadleaves and conifers ecosystems, delivering the data to Institute of World Forestry in Hamburg, Germany.

The Moldova experts are working in GAINS module, estimating the emissions in energy and transportation sectors.

Cost – benefice analysis on air pollution have not been carried out.

The links with Biodiversity Convention and Climate Change Convention should be done. We can use the data from the National Reports provided to these conventions.

The Republic of Moldova has not yet established its National Focal Centers. Support has been requested from the We ask the CCE support has been requested for the creation of Moldova-NFC. This should include the following activities:

- The establishment of Modelling and Mapping methods in Moldova;
- Expert basis for carrying out work under the CLRTAP and ICP- Vegetation in Moldova in period 2012 / 2020;
- Expert basis for heavy metal and nitrogen monitoring in Moldova in the period 2012/ 2020 in the frame of the CLRTAP.

Slovenia:

In Slovenia, ICP M&M activities are still supported only by different national and European scientific projects. The establishment of an official slovenian National focal centre of Slovenia remains uncertain. Results for critical loads modelling were, however, requested by the Ministry of environment last year for the national yearly environmental report.

In the forthcoming period Slovenia will continue with the modelling of critical loads and exceedances of the ICP forest level II sites. There are 10 such sites available.

At regional level, the activities take place currently to refine the spatial pattern of nitrogen deposition for Slovenia using moss data of the ICP Vegetation programme. The application of the Veg raised questions that remain unresolved (spatial heterogeneity of vegetation which precludes large biodiversity loss predicted by "average" conditions, uncertainty of model outputs, definition of plant functional types related to eutrophication, etc.). Current predictions by Veg for our test sites in our opinion show too large vegetation shifts and diversity loss. These points need to be answer before the Veg model is applied at regional scale in Slovenia.

An effort will be made to adapt GrowUp tool (uptake prediction) to forests with close-to-nature management (no clear cuts, uneven-aged trees, self-regeneration) which are widespread in Slovenia and also in other regions of Europe (especially in protected areas).

Sweden:

The Swedish NFC for ICP M&M (IVL) is working closely together with the Swedish Environmental Protection Agency. On national level large effort is put into reaching the targets of the 16 different Swedish national environmental objectives. These objectives are being reviewed this year. There are several objectives related to eutrophication, acidification and biodiversity, which are connected to work done in ICP M&M. In Sweden there is also a growing interest in exploring the concept of Ecosystem Services. Several national projects such as SCARP, CLEO, Future Forests and BECC are concerned with these items and the coupling to air pollution, climate change and land use.

Sweden will not reach the target set for the environmental objective for e.g. acidification of surface waters. The NFC and the Swedish EPA are concerned that the emission decrease is not sufficient for fast and complete recovery of Swedish lakes. The NFC therefore finds it

important to continuously follow the state of forest soils and surface waters and to continue work on preventing the deposition of acidifying substances to exceed the critical load. Therefore, Sweden is still putting effort into refining and updating the critical load calculations. Also, Sweden supports the work on end-points for biological recovery and biodiversity.

Lastly, the Swedish NFC welcomes the Calls for data, as these give support for further national work in Sweden and elsewhere and provide communication link between national efforts and CLRTAP.

Switzerland:

Main topics studied are: Alpine ecosystems, interaction between N deposition and climate change; relation between N deposition and biodiversity changes based on results from a gridded biodiversity monitoring; effects of nitrogen deposition and ammonia concentrations on lichens; comparative assessments of ecosystem protection using critical loads of nitrogen or critical levels for ammonia (critical levels are less stringent than critical loads); soil solution monitoring at selected forest sites in order to have soil chemistry data for comparison with outputs from dynamic modelling ; ozone effects on forest trees, flux parameterization for spruce and oak. For deriving emission reduction targets the focus continues to be based on the classic critical load approach, e.g. air pollution goals for agriculture derived from critical loads of nitrogen. Further work is planned to analyze links between critical loads exceedances and biodiversity changes. NFC recommends that a new call for data is issued so that further site specific dynamic modelling work is done prior to going to regionalization. Collaborations are ongoing with ICP Vegetation, Forests, Waters and Materials. Participation in the Task Force on Health to address particulate matter and black carbon from biomass and diesel fuel burning.

Ukraine

NFC is not yet organized officially, but the initiated scientific group in Autonomic Republic Crimea continues its works under the LRTAP Convention. The critical loads for heavy metals have been calculated as well as their exceedances in different regions (central, western, south) of Crimean peninsula for terrestrial ecosystems. This year, these calculations were also carried out for the eastern region of the peninsula. These collected data are used in investigations of heavy metals effects on human health.

Information on depositions of nitrogen has been collected and calculation of nitrogen and sulphur critical loads has started.

Another important topic in Crimea is the presence and effects of pesticides, as their use is very intensive in the peninsula.

There is a good collaboration with the Republic committee of environment protection in the Crimea who provides some financial support.

United Kingdom:

UK NFC work is focussed on critical loads for acidification and eutrophication (UK broad habitats and UK Natura 2000 sites), dynamic modelling, niche modelling and biodiversity indicators. The NFC has also carried out (a) a deposition (S and N) modelling and exceedance comparison study for Defra looking at the results of 6 UK models; (b) small study for Natural England comparing modelled risk assessments and the results of botanical site surveys aimed at identifying the discrepancies between the two. The NFC uses UK data from

most other ICPs for its modelling activities. Critical load and dynamic modelling reports are published on the project web site. The NFC is in contact with and collaborates with UK habitat experts involved in reporting under the Habitats Directive. The NFC did not respond to the "call for contributions" as current funding did not include any staff time for dynamic modelling activities. The current contract the UK NFC has with Defra is coming to an end this month (April 2012) and the NFC is waiting to see what level of funding will become available from Defra for future years. Other related UK work (not necessarily involving the NFC): ozone mapping and impacts; the impacts of climate change on critical loads; valuation of ecosystem services. UK involvement in the Eclaire project is enabling further collaboration between the ICPs.