Critical Loads: Call for Data

Coordination Centre for Effects (CCE)
ICP Modelling & Mapping

J-P Hettelingh, M Posch, J Slootweg
www.wge-cce.org
Parties agreed at last ICP M&M meeting ... 
... to a Call for a updated CL Data... with emphasis on biodiversity ...

**Reasons:**

1. Some NFCs have updated their CL data (e.g. AT, SE);

2. Biodiversity (in form of plant diversity) should be incorporated into CLs;

3. EMEP depositions are now (also) provided on Lon-Lat grid
Grid system:

- Current CL data base on EMEP 5 km x 5 km grid, compatible with EMEP depositions on 50 x 50 km² grid

- Since 2013 EMEP depo data (and transfer matrices!) also available on 0.50° x 0.25° Longitude-Latitude (LoLa) grid

- As of next year EMEP depositions (also) available on 0.1° x 0.1° LoLa grid!

→ New/updated CLs asked on 0.10° x 0.05° LoLa grid
  (to ensure compatibility with both LoLa grids)

By the way: 0.10° x 0.05° ≈ 5.5 km x 5.5 km (at 60°N)
Thus ... Call for Data 2014/15:

NFCs requested to submit updated/new Critical Loads for ...

a. N-Eutrophication (SMB)

b. N-empirical

c. Acidity (CL function; SMB)

d. N-S CL function for plant diversity

a-c: ‘classical’ (existing) CLs

d: new ...
Ad d:

Derive N and S CL function from your (favourite) biodiversity model ...

e.g. Veg, PROPS, BERN, MultiMOVE, ...

... or from empirical data ...

... using the agreed-upon Habitat-Suitability Index
Habitat Suitability (HS) Index:

\[ HS = \frac{1}{n} \left( \frac{p_1}{p_{opt,1}} + \frac{p_2}{p_{opt,2}} + \cdots + \frac{p_n}{p_{opt,n}} \right) \]

\( p_j \) = probability/suitability/possibility of plant \( j \)
\( p_{opt,j} \) = optima (maximum) prob. of plant \( j \)
\( n \) = number of plants

Which species?
Suggestion: \( n \) = number of desired species
Derivation of N-S biodiversity CL function, \textit{for example}, along the following lines (using PROPS) ...
PROPS DataBase: Occurrence probability for single species
Isolines in [N]-pH plane [could be C:N-Bsat plane, ...]

Temp and Precip fixed

Single plants combined into HS index ...
Example for an EVM vegetation unit

... But we need relationship with $N_{dep}$ and $S_{dep}$
The same as function of N and S deposition:

Computation from physico-chemical site characteristics and steady-state model (here: SMB).

Chose a “critical” N_{dep} - S_{dep} range →
Apply limiting/critical/acceptable value of index, e.g.:
Simplify to N-S Critical Load function:

![Graph showing the relationship between S_{dep} (eq/ha/yr) and N_{dep} (eq/ha/yr) for the HS-index (17 species). The graph includes contour lines and a color scale indicating probability (Prob) values from 0.00 to 0.90.]
N-S Critical Load function:

Characterised by 4 numbers: CLN_{\text{min}}, CLN_{\text{max}}, CLS_{\text{min}}, CLS_{\text{max}}
Coverage:

(i) As good as possible, but ‘extensity’ more important than ‘intensity’ ... especially:
Don’t protect more than the total land area in a grid cell!

(ii) Concentrate on protected areas (Natura2000)
Thank you! 😊

Any questions? 😊