# MSC-W work in support of CCE/WGE activities

- Input to the (revised) 'Guidance document on health and environmental improvements', compiled by CCE on behalf of the WGE
- Contribution to  ICP-Vegetation
- S-R matrices
- New EMEP grid – changes in potential ecosystem damage
- Base cations: Na+

# Input to 'Guidance document'

- GP_2005, GP_CLE_2010, GP_2020, GP_CLE_2020 and GP_CLE_2030
- 5 meteorological years
- CCE then distributed the relevant variables to the other ICPs, so they could do the calculations for their contribution to the 'Guidance document'.

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# Contribution to ICP Vegetation

- Modelled ozone data used for :

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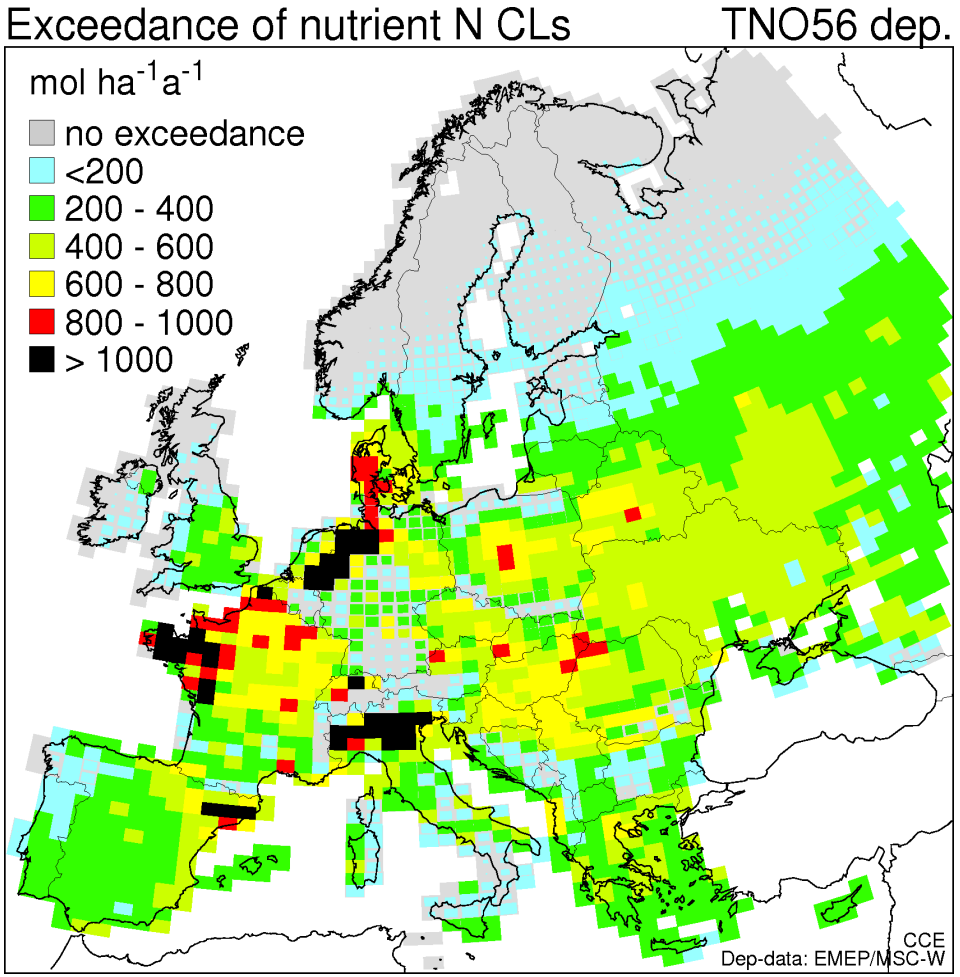
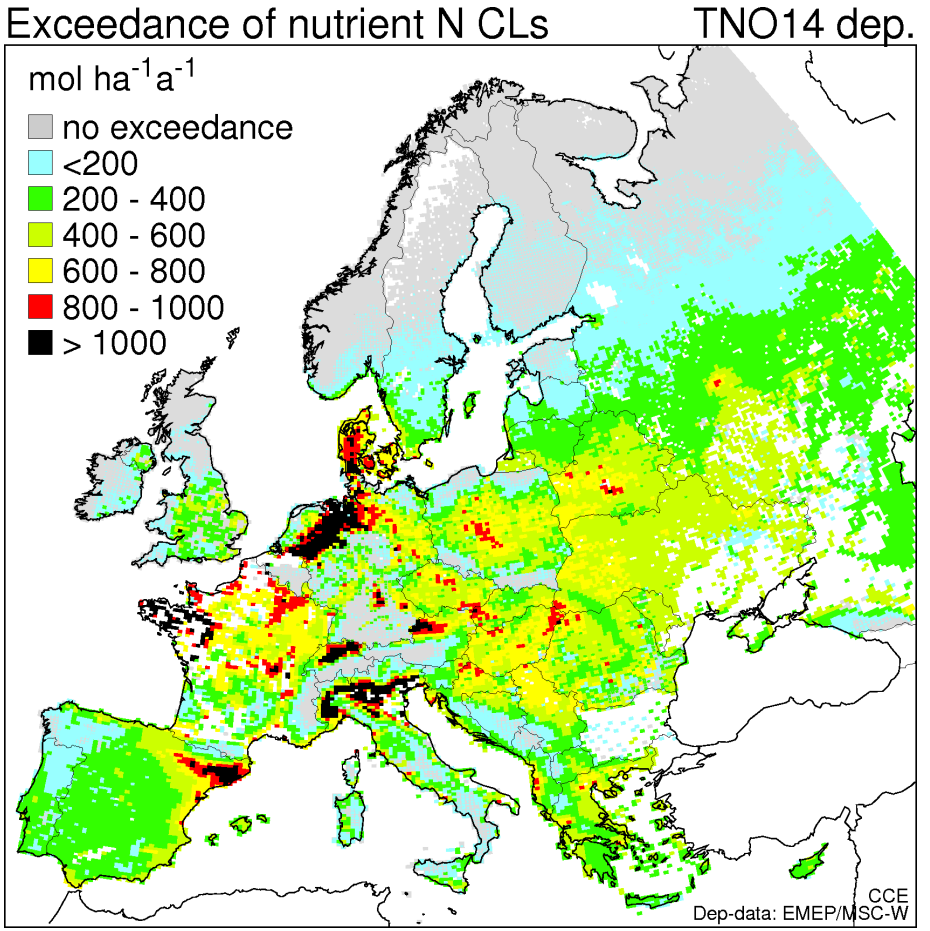
# Critical load exceedances in different resolutions



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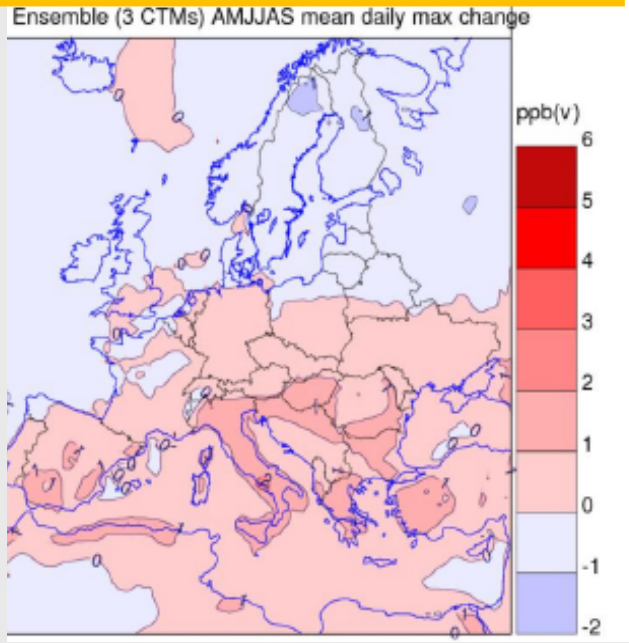
# Base cations

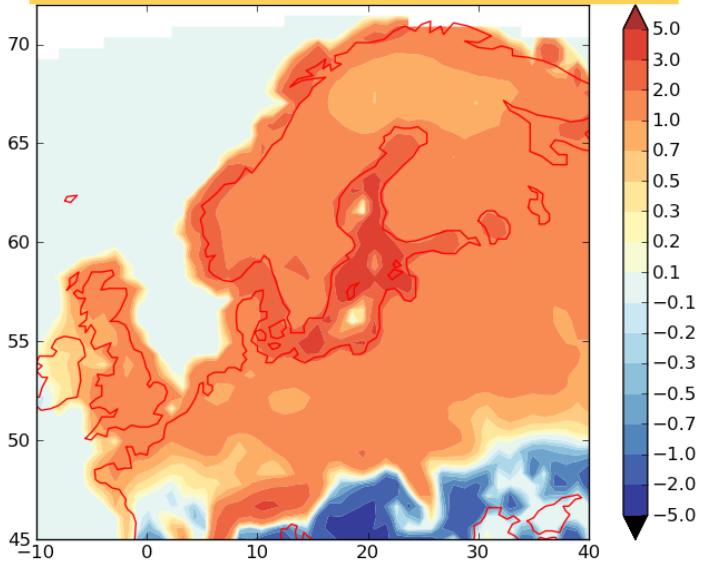
- 'climatological' data for marine Na+ deposition 2000-2010
- Other base cations are needed, should this be a priority in the workplan?

# Changes in risks to northern European forests

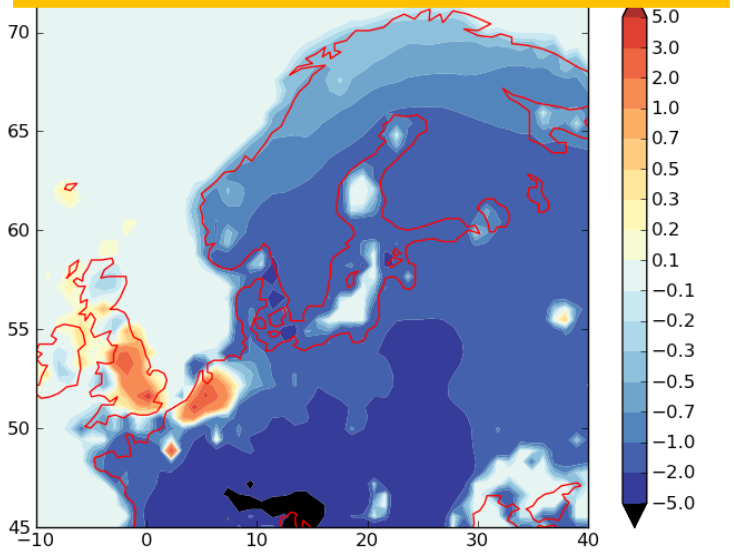
## Effect of climate on ozone



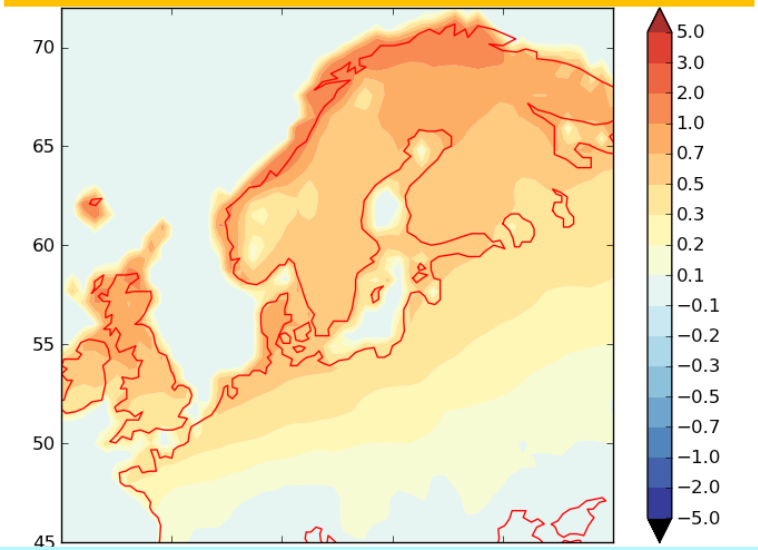

## Effect of climate on POD1




## Effect of emissions on POD1

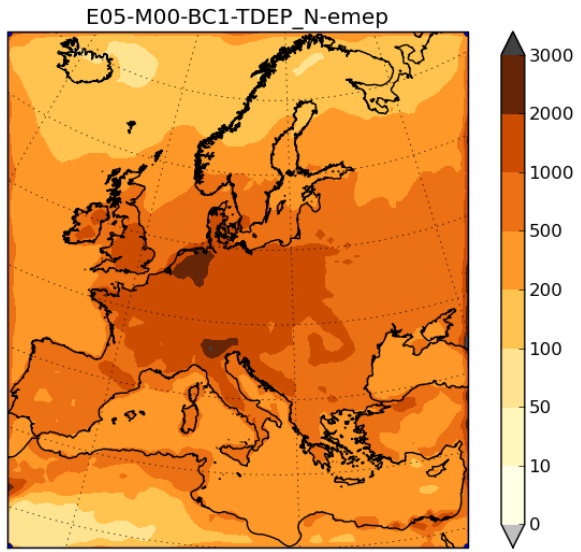



## Effect of arctic shipping emissions on POD1

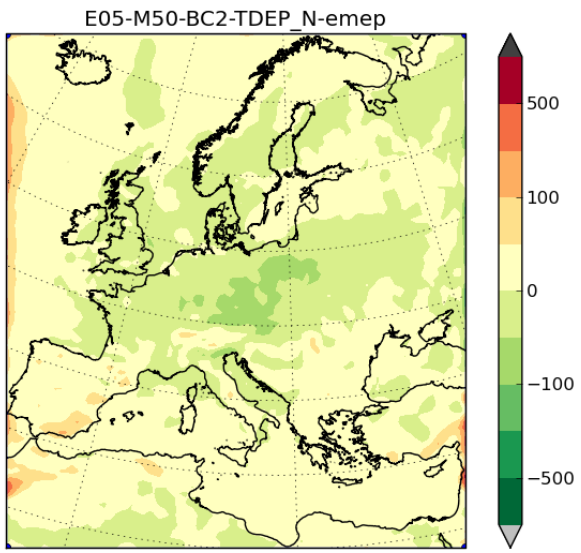



Tuovinen, Hakola,Karlsson, Simpson . Climate Change, Air Pollution and Global Challenges, Volume 13: Understanding and Perspectives from Forest

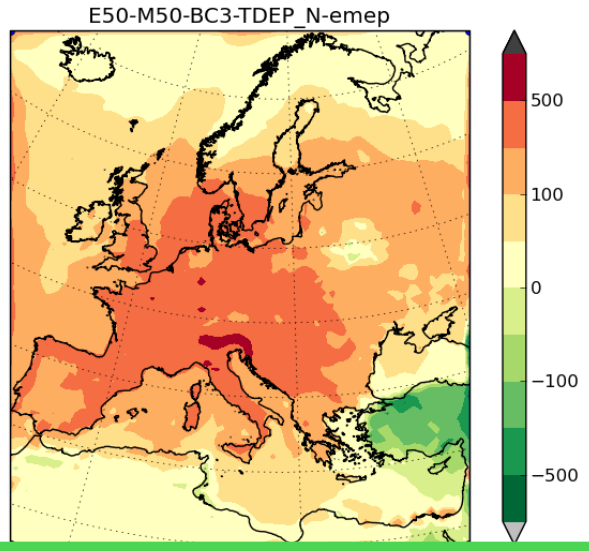
# Changes in nitrogen deposition, 2000-2050




Base case (1990-2009)




Effect of climate




Effect of climate & emissions

- Climate penalty for N dep
- Large difference between models
- NH3 emissions projected to remain practically unchanged – unknown impacts from changing temperature on NH3 and soil NO

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- Future scenarios of depositions/concentrations

# What is needed for a proper modelling of base cations?

- Sea salt (parametrized)
  - Sea spray source function
- Wind blown dust (parametrized)
  - Base  cation content of the soil (many different soil types with different percentages of base cations)
- Antropogenic emissions (input)
  - Ca,Mg,K,Na. Fraction of PM10, PM2.5 per country and sector

# Critical load exceedances in different resolutions

Table 4.1: Ecosystem area exceeded and average exceedance (AAE) for acidity and nutrient N critical loads in the EU28 region and in the whole of Europe using depositions modelled on the TNO56 and TNO14 grid, using meteo and emissions from 2009. Corresponding results from this years report of 2011 conditions are given for comparison.

| Region | Grid | Acidity Critical Loads | | Nutrient N Critical Loads | |
|---|---|---|---|---|---|
| | | Area exc. (%) | AAE (mol $ha^{-1}a^{-1}$) | Area exc. (%) | AAE (mol $ha^{-1}a^{1}$) |
| EU28 | TNO56 | 8.54 | 30.0 | 65.4 | 260.0 |
| | TNO14 | 8.18 | 28.2 | 64.4 | 243.7 |
| | EMEP-2011 | 6.8 | 19.9 | 63.4 | 230.5 |
| Europe | TNO56 | 5.90 | 18.6 | 58.8 | 193.6 |
| | TNO14 | 5.78 | 17.4 | 58.1 | 184.1 |
| | EMEP-2011 | 4.8 | 12.9 | 59.5 | 180.0 |