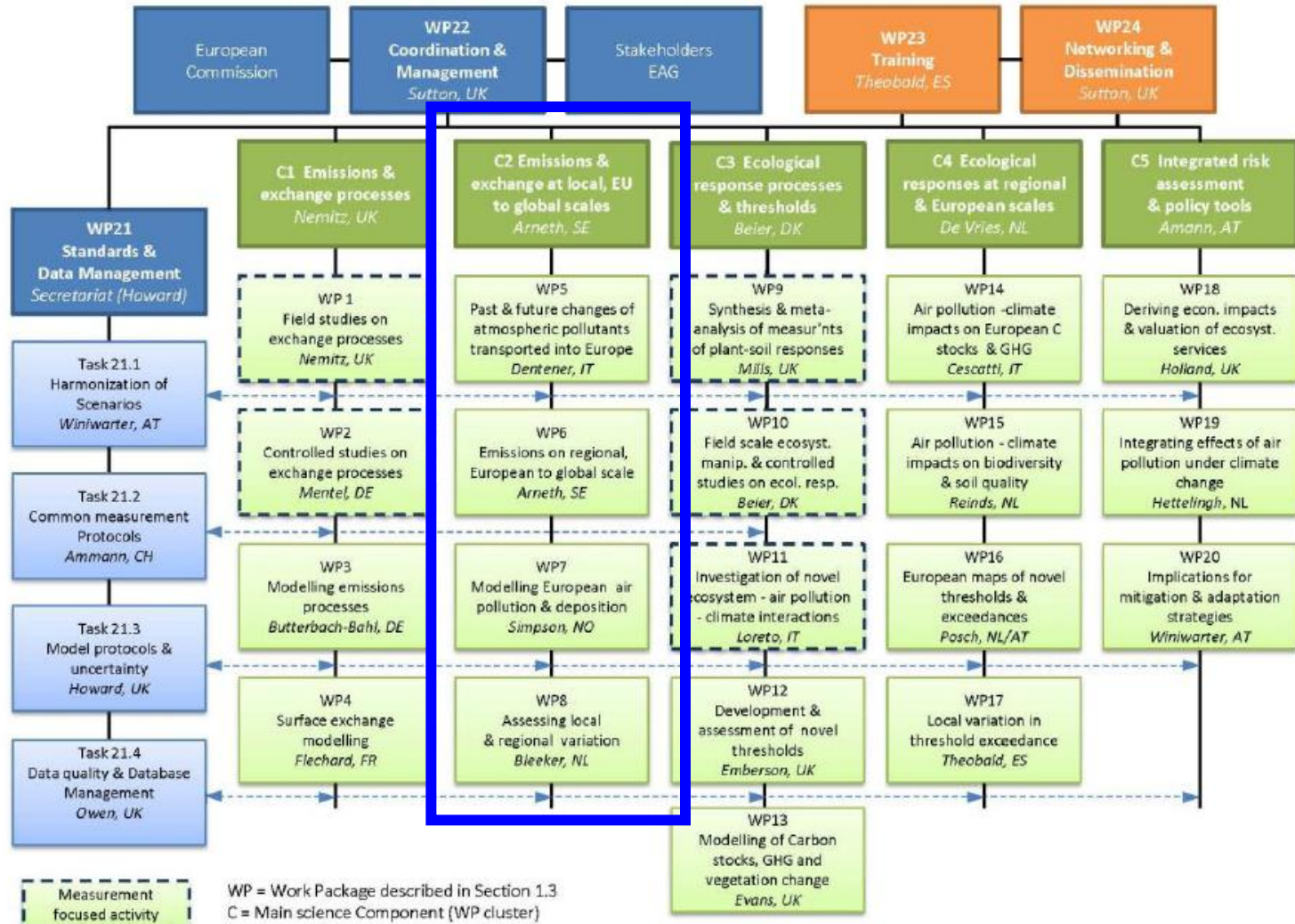


C 2: Emissions & exchange at local, EU to global scales



- 1) understand **past and predict future trends** in Northern Hemispheric O₃ concentrations (WP5);
 - 2) provide frameworks to model **spatially and temporally resolved emission fields** in response to meteorology (WP6);
 - 3) and **pollutant deposition fields** at the European (WP7) and global scale;
 - 4) better understand the **air quality and climate change interactions at local and regional scales** (WP8).
- provide exposure and deposition inputs for the development of metrics for ecosystem threats (C3) and to assess ecological responses under current and future climate (C4)

Deliverables

- ✓ D7.1 Maps of current air pollution metrics (APMs) across Europe, from the EMEP models and five other CTMs

D5.1 Assessment of current GCMs and CTMs (M18) - near finalised; end of 2013

D5.4 Boundary conditions for regional conditions (M24) - initial bc. available (not yet with climate change or RCP emissions); end of 2013

D8.3 Concentration and deposition maps (Month 16): in progress. Waiting for final EMEP4UK simulations and a contingency solution to provide the landscape data (to be discussed in Zagreb)

Component 2 : The formal stuff

Upcoming:

Deliverable 6.2; Improved terrestrial (semi)natural and agricultural emissions (M30)

Deliverable 6.2; Sectoral emission profiles for selected source sectors and countries (M30)

Deliverable 7.5; Source-receptor matrices of APMs for current and future conditions (M36)

Deliverable 8.2; Report on local scale interactions between air quality and climate change (M30)

Deliverable 8.4; Sub-Grid module for inclusion in the EMEP model (M30)

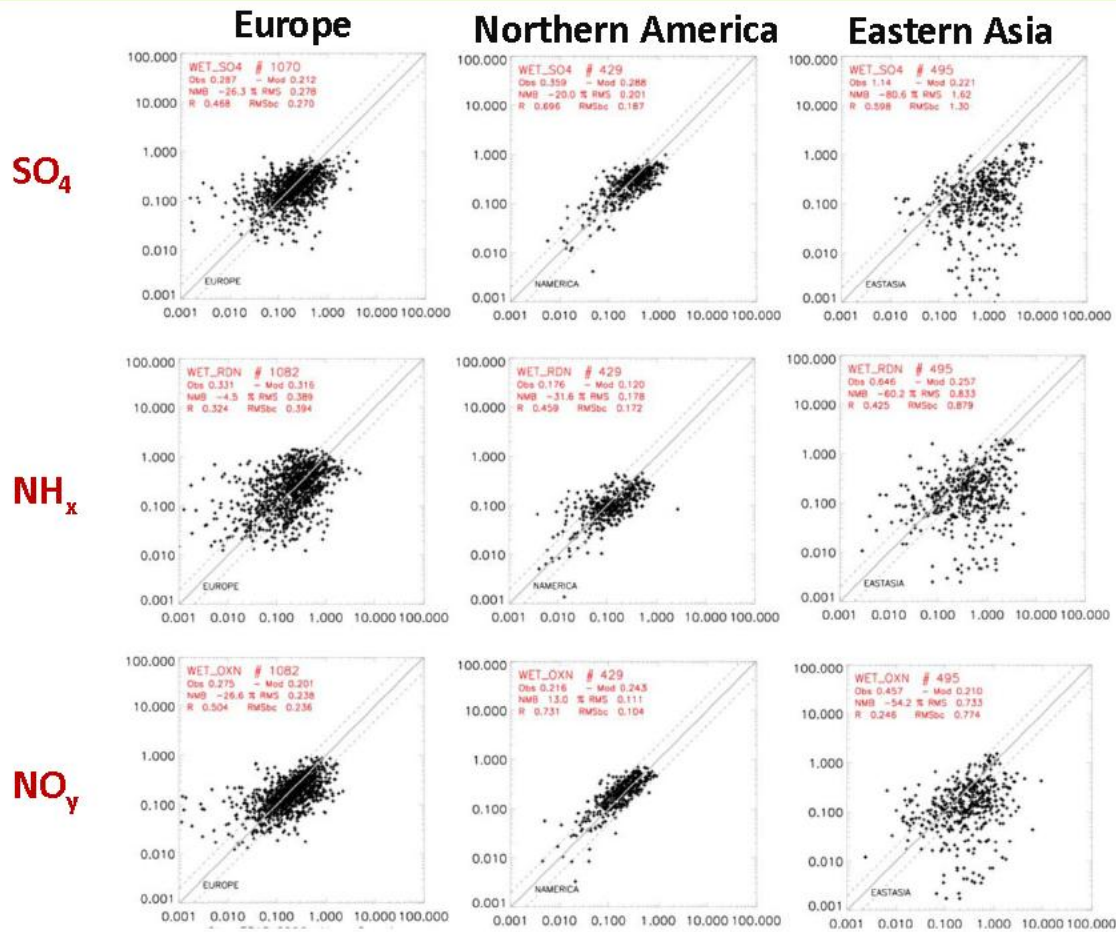
C2 : some main achievements

- 1) Initial simulations of mean pollutant concentrations and total deposition of reduced nitrogen (EMEP4UK).
- 2) Further progress made on dynamically modelling future ammonia emission
- 3) Enhance Landscape DNDC w.r.t. soil NO
- 4) BVOC & fire emissions: updates on emission factors and compounds; dynamic BA module
- 5) CTM intercomparison(s) - maps and comparison with observations available, current and future years
- 6) Delivery of 150 years (1900-2050) O₃ and N-deposition data from EMEP model to ecosystem models

Science progress

(examples subjectively selected by Almut, based on a wealth of input received from C2 groups)

LMDz-INCA Calculated vs measured wet deposition

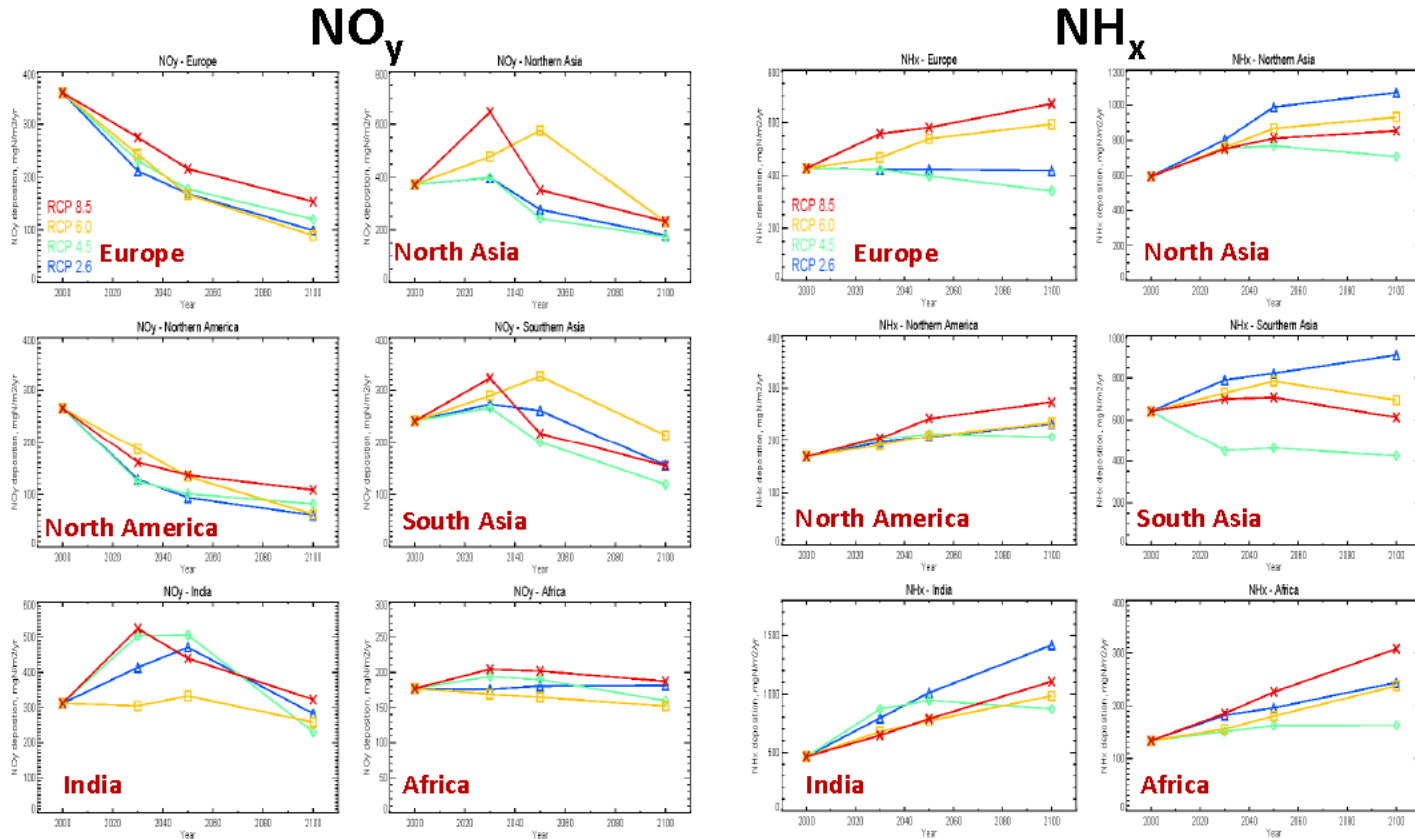


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LMDz-INCA: modelled deposition over the 21st century due to changes in emission

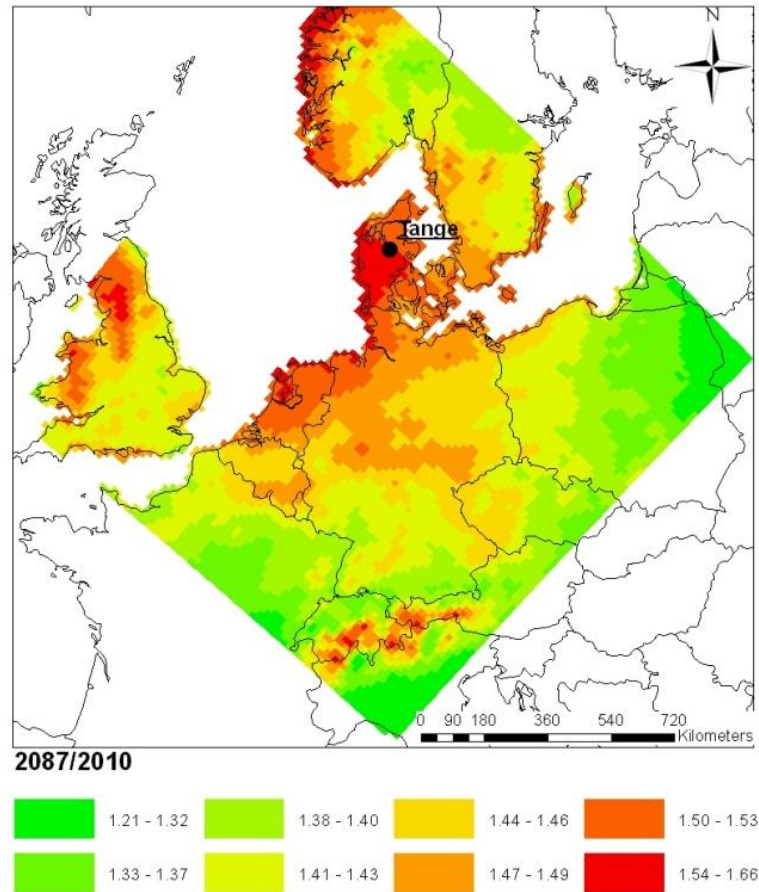
Evolution of NO_y and NH_x surface deposition (TgN)



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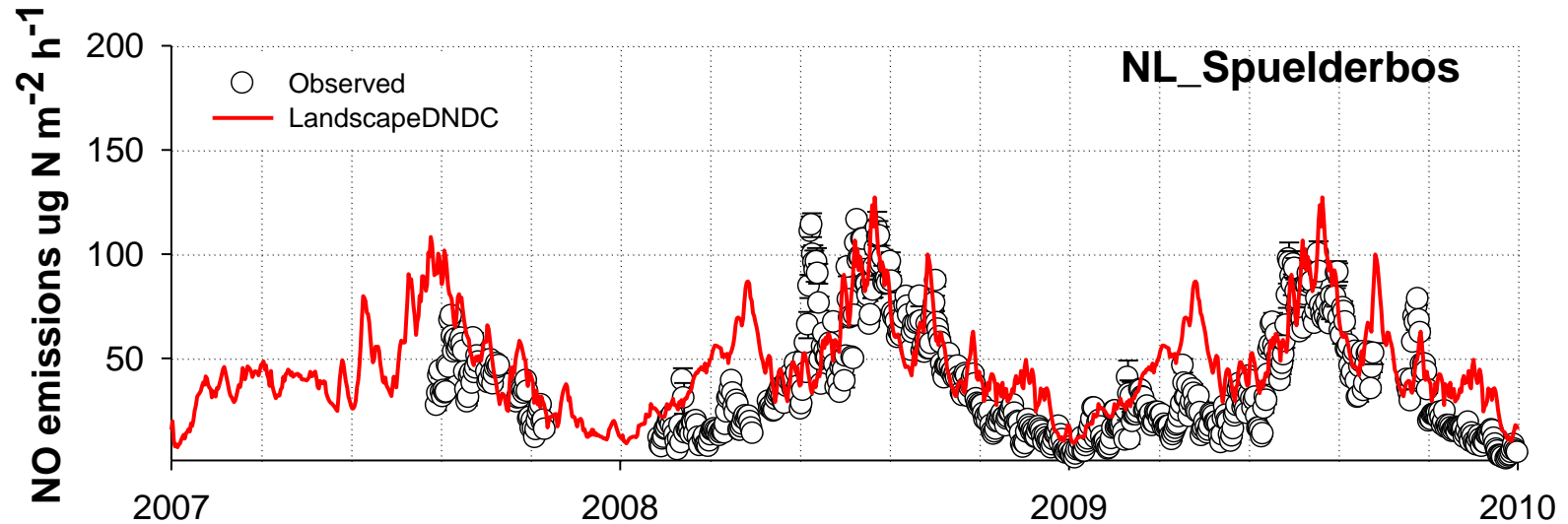


Example of results from Danish study (Skjoth and Geels, ACP,2 013)
The climate "penalty" on NH₃ emissions
(standard Danish storage moved to other locations).



2087 relative to 2010

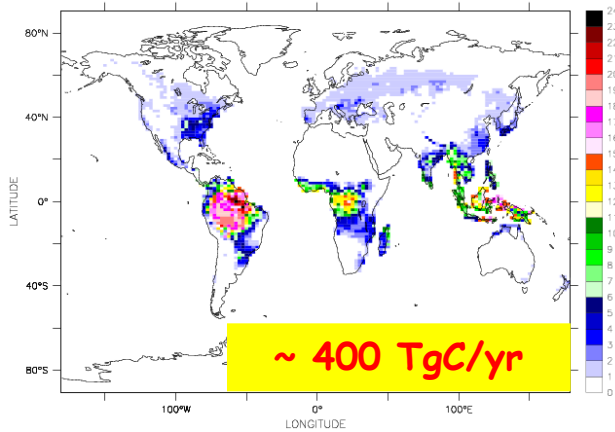
Modeling soil NO emissions from terrestrial ecosystems



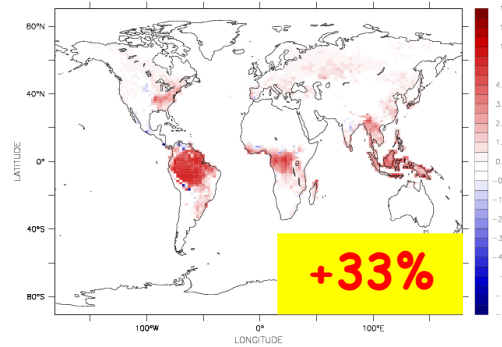
Potential of LandscapeDNDC for capturing soil NO fluxes at Dutch Douglas forest (*Pseudotsuga menziesii*) ecosystem.

Component 2 : some main achievements - WP6

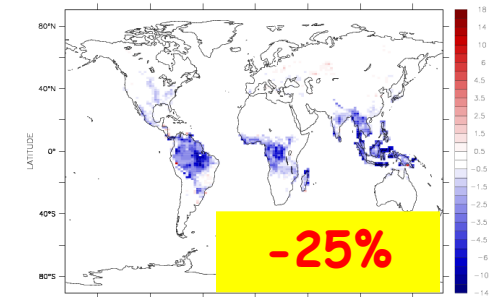
- Isoprene present (mgC/m²/h) -



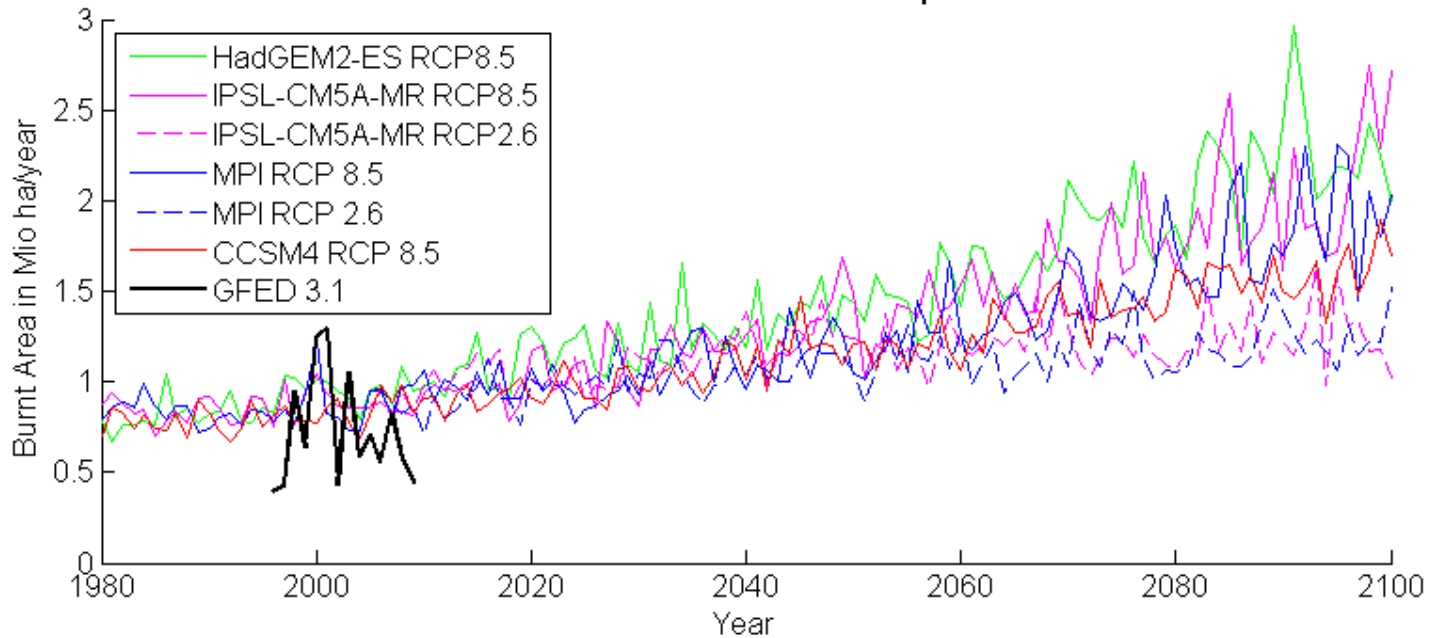
- 2050 CLIMCO2 -



- 2050 CLIMCO2LU + Poss -

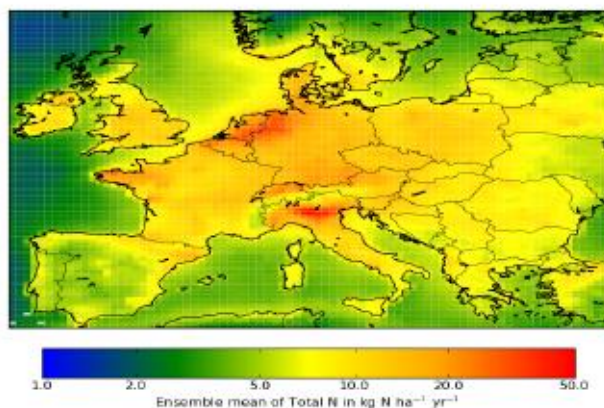


Total Burnt Area for Europe

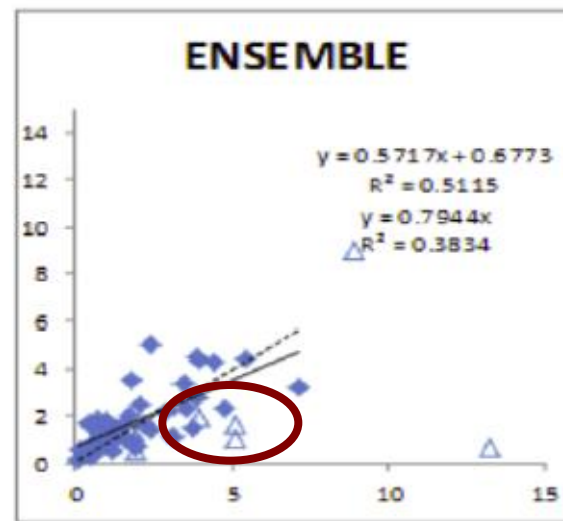
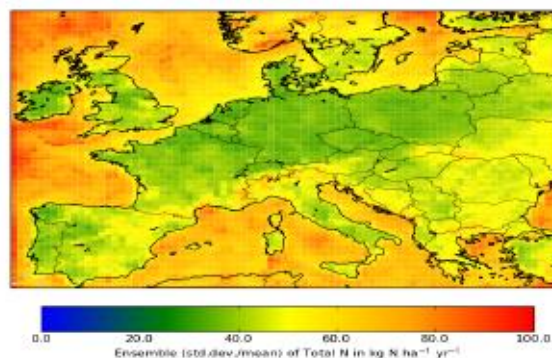


ECLAIRE Comp-2009 NH₃ – vs NitroEurope Obs.

Ensemble Mean N-Dep (Kg/ha):



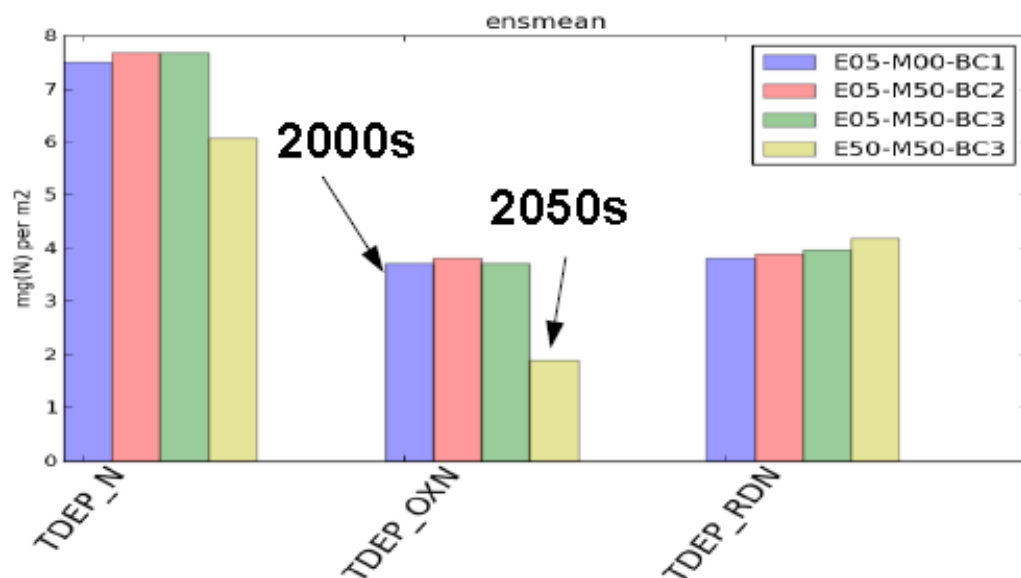
Ensemble Std.Dev./Mean:



Conclusions:

- Inter-model spread ~ 30-50% for Land areas
- Largest differences in dry deposition – difficult to constrain (lacks observations!)
- Models generally good for NH₃ over semi-natural areas

EnsClim – Climate change vs. Emissions

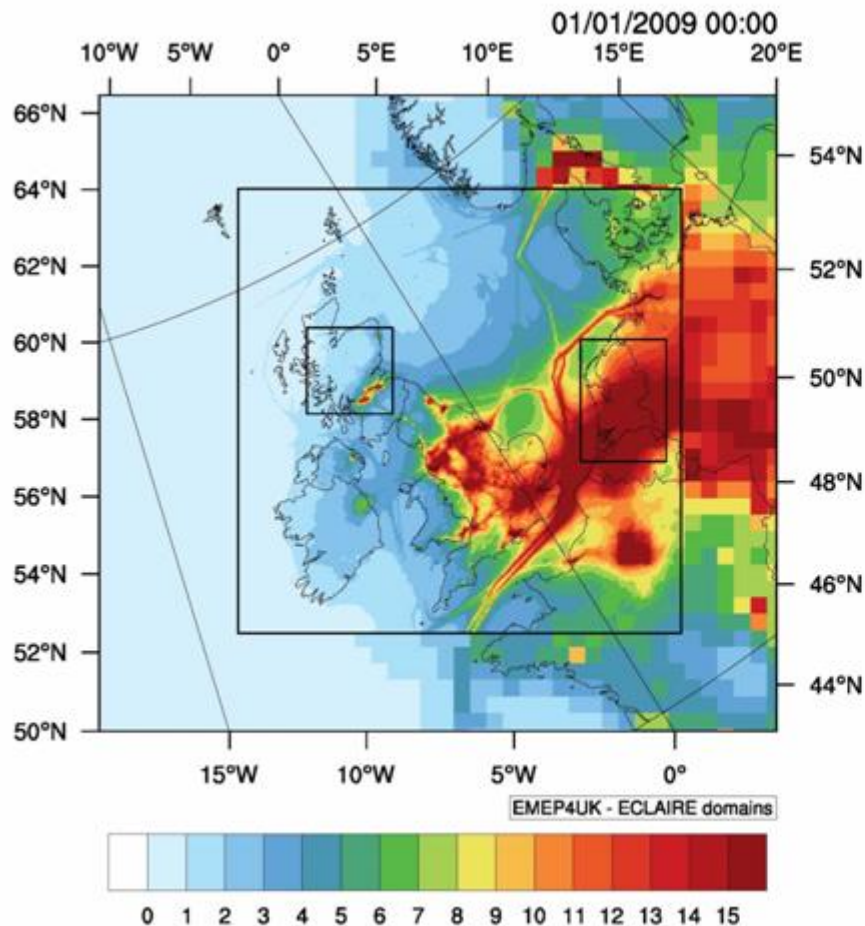


- 4 CTMs, 4 experiments, 20 year time slices for 1990-2009, 2040-2059
- Effects of emissions >> effects of meteorology or hemispheric emission changes
- With ECLAIRE 2050 emissions, Nr-dep will decrease to some extent. Much depends on NH₃ assumptions!

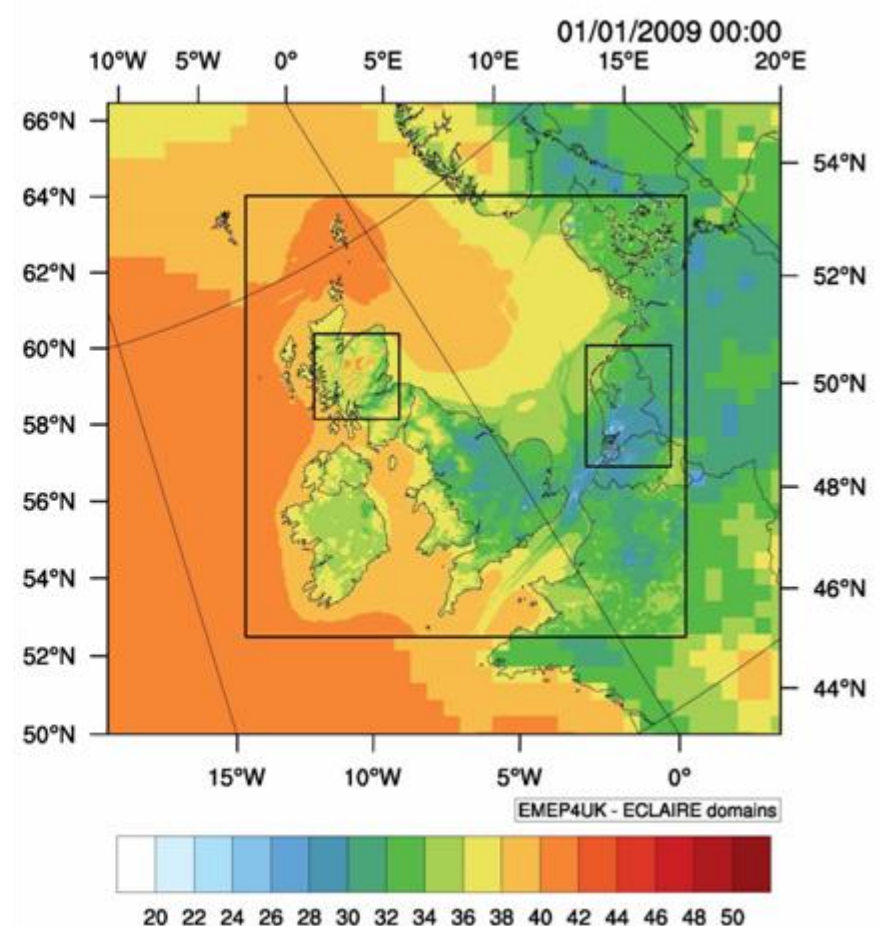
WP 8: Assessing local and regional variation

EMEP4UK Simulations at 5 x 5 km and 1 x 1 km resolutions (2008)

Mean NO₂ concentrations ($\mu\text{g m}^{-3}$)



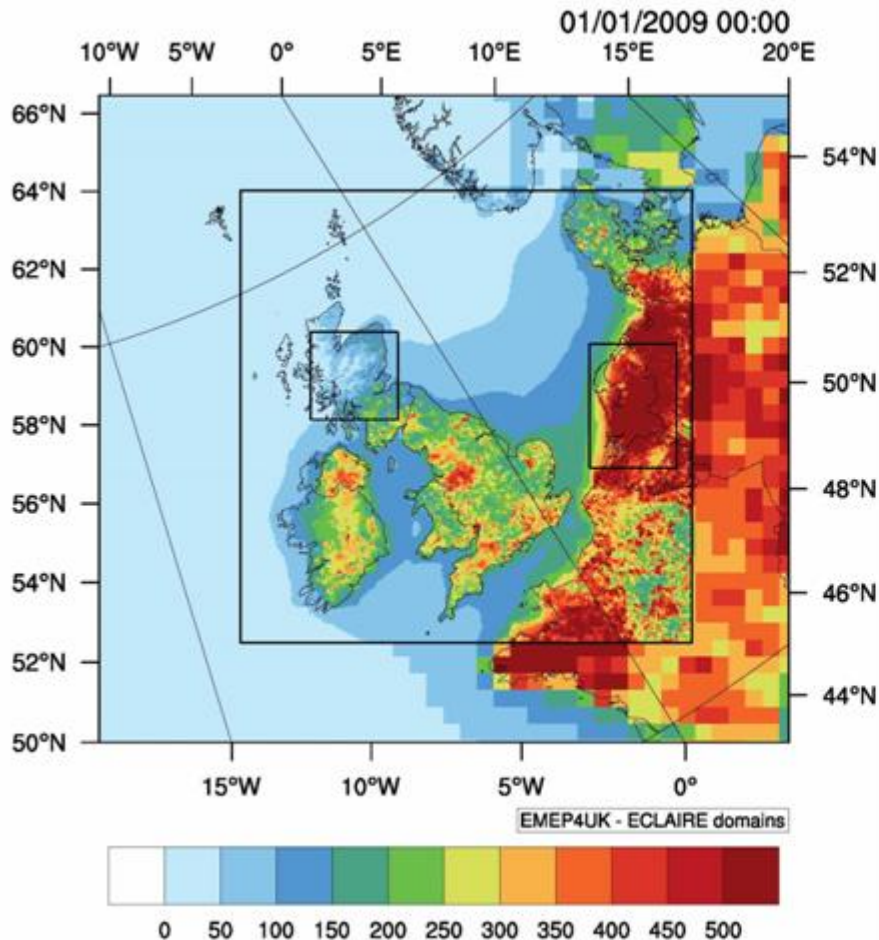
Mean O₃ concentrations (ppb)



WP 8: Assessing local and regional variation

EMEP4UK Simulations at 5 x 5 km and 1 x 1 km resolutions (2008)

Dry Deposition Reduced N ($\text{mg N m}^{-2} \text{yr}^{-1}$)



Wet Deposition Reduced N ($\text{mg N m}^{-2} \text{yr}^{-1}$)

