

NitroEurope as a contribution to the EMEP Monitoring Strategy

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What is NitroEurope?

- A 5 year EU Integrated Project (IP)
- Runs from February 2006 to 2011
- 64 partner institutes in over 20 countries
- Cost €27M. EU contribution €16.6M



NitroEurope IP



- What is the effect of reactive nitrogen supply on the direction and magnitude of net greenhouse gas budgets for Europe?
- Effect of N on GHG balance:More GHGUnclearLess GHG N_2O (+2' from NH₃, NO₃⁻)Cattle CH₄C uptake in plantsCH₄ wetlandsSOM decompositionNitrogen Aerosol $NO_x \rightarrow O_3 \rightarrow$ less C uptakeVV
- To what extent would a more-integrated management of the N-cycle and its interactions with the C-cycle have potential to reduce greenhouse gas and N_r emissions simultaneously?



Abatement may swap one pollutant for another in the nitrogen cascade

NitroEurope Overall Science Structure





Plus four supporting components: C7. Standards and Data Management C8. NEU Management

C9: NEU Training C10: NEU Dissemination

NitroEurope Component 1: Flux Network



The NEU Flux Network in support of the EMEP monitoring strategy



• NEU Level 1: "Inferential Sites"

- Low cost monitoring of gaseous NH₃, HNO₃ and aerosol HNO₃, NO₃⁻ concs and wet deposition at 50 sites.
- NEU Level 2: "Regional Sites"
 - Development of low cost N flux methods
 - Implementation to quantify dry and wet N and GHG fluxes at 9 sites
- NEU Level 3: "Super Sites"
 - Detailed N high time resolution flux measurements and process studies on overall site N budgets
 - 'Special Topic' campaign measurements on key N fluxes
 - Could contribute to EMEP "Intensive Periods"

NEU Level 1 network



Objectives

- Deliver N dep estimates to CarboEurope CO₂ flux sites
- Simultaneously provide N gas+aerosol concentration field for EMEP

Methods

- Low-cost monthly DELTA denuders at 50 sites of CarboEurope IP
- Bulk wet deposition at selected sites

Sharing technology

- DELTA method workshop (Edinburgh, July 2005)
- Main effort shared between CEH, SHMU, HMSC, FALD, NILU + comparison with other groups (CEAM, IVL, CNR)
- Intercomparison of implementation 3 sites Summer 2006





Dec-88

Aug-91



May-94

Nov-99

Aug-02

Feb-97

Regional gas & aerosol concs from UK HNO₃ Network



Centre for Ecology & Hydrology PERSONAL CONTRACTORY DESCRIPTION









HCI (ug m-3)









The NEU L1 DELTA Network



The NEU L1 Wet Dep Sites



NitroEurope Flux network Level 2 & 3 sites

13 Level 3 Super Sites9 Level 2 Regional Sites50 Level 1 Inferential Sites

22 Core Manipulation Sites14 Assoc. Manipulation Sites



NEU Flux Network Sites in Climate Space



Level 2: Flux Monitoring:

Testing of methods, including
Time Averaged Gradient (TAG) system
Time Integrated Relaxed Eddy Accumulation
Utilizes the DETLA approach with conditional sampling for seasonal dry deposition estimates





Ambition of Super Sites to give full N and GHG perspective



Level 3 Super Sites: N budgets and special topics





Eddy covariance for NH₃ now possible – but still not easy

Linking Tasks and Delivery in NEU



C1 Flux Networks
Methods development
Integrated air, plant and soil data
Process understanding



C2 Manipulation

- Process testing
- System responses to perturbation
- Interactions between drivers

Linking Tasks and Delivery in NEU





C3 Plot-scale modelling •Reconstruction of observations •Explanation of interactions •Prediction of future responses C4 Landscape analysisSpatial interactionsComplexity

- •Management interactions
- •Abatement strategies

Linking Tasks and Delivery in NEU



E CH4 [G9 /) FRANCE 「パ / 55] 7H3 **C6: Verification** •Independent data check

•Uncertainty assessment

•Revision of IPPC/UNECE values

•Protocol compliance

Inverse model CH₄ emission estimates

- C5 European Integration
 Upscaling
 Improving input datasets
 Ecosystem vs multi-sector models
- •Past changes and future scenarios

Further information

- See <u>www.nitroeurope.eu</u>
- Project Office
 - Stefan Reis, Joyce Luk
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