Minutes NitroEurope C1 Meeting Edinburgh
15 September 2009-09-15

Present: Anoud Frumau, Andreas Ibrom, Nick Brueggemann, Ana Meijide, Laszlo Horvath, Annalea Lohila, Janne Korhonen, Margaret Anderson, Sue Owen, Teresa BertoliniMarsailidh Twigg, Julia Drewer, Stephanie Jones, Catharina Don, Benjamin Loubet, Chris Flechard, Albrecht Neftel, Eiko Nemitz, Ute Skiba, Jagadeesh Yeluripati, Kairsty Topp, Sim Tang, Mark Sutton, Rebecca MacKenzie,

Tuesday 8:30 – 10:45

Aims (Ute):

- To review data status, data quality control & identify gaps
- To decide on data analysis strategy and identify papers to be written
- Good synthesis presentation at next NitroEurope meeting
- Paper write-up shortly after
- Data to modellers by 1 Nov
- Need to work with modellers; different strategies for different ecosystem types

Data management (Sue):

- Database upgrade has been done to overcome a number of problems (graphics, reporting, speed, L3 methods & comments, C1 multi-varied key fields)
- First release in April, quite slow
- New release imminent
- Arrange online presentation for next day (Action EN to get wireless connection)

Metadata (Ute):

- **Uncertainty** should relate to 'instrument uncertainty'
- Action Sue change title to 'Instrument Uncertainty'
- At present some uncertainties in absolute some in relative terms
- should be given as a combination of absolute and relative (e.g. 5% or 0.5 ppb, whatever is greater)
- uncertainty of measurement is provided elsewhere (e.g. represenativeness for field)
- updating: submit whole 6-month block again and it will overwrite with

- Action Sue:'**Exposure**' should read 'Direction of slope'
- 'Number of soil layers' should read 'Number of soil horizons to 1 m'

- Action Sue '**Thickness of soil layers'** should read 'Thickness of soil horizons' and should if possible include a description of the soil layers down to 1 m depth.
- Add example as comment to label

- We will be able to upload **pictures** as ancillary files in the future.

- '**Litter type'** refers to above-ground; should capture for grassland, plant residues

- How do we capture '**fetch**'?
- Capture fetch size in 20 deg, with next surface beyond fetch (36 new values, 18 numeric, 18 text)
- Submit Google Earth graph with field delineated
- Update contact details if required
- A new question to everybody regarding the temperature and rainfall data on the Metadata sheet. Are these long-term averages?

Methodology (Ute)

- **Methodology**: everybody needs to write and describe the methods and instruments in greater detail. Include:Manufacturer, model
- Text fields in database limited to 255 characters

Annual data / site management data (Benjamin Loubet)

- data incomplete especially for latest upload
- **root biomass**:
    - rarely measured – a lot of work; only available for two forest sites;
    - considered optional by modellers
    - huge resource to improve over estimated values.
    - Modellers should contact site operators to derive best estimates (e.g. maybe data available for similar plots in the vicinity)
- Action Sue Get rid of **Max LAI/height**. This is misleading. The higher resolved data are more useful.
- **Plant functional type** concept ok for mixed ecosystems but not for cropland, for arable 'arable' is sufficient.
- Little information **on forest litter**; measured but not reported; 9 month lag as it is done by partners.
- **Wood biomass / wood increment** missing at Hoglwald and Speuld (need to come from forestry commission). Action Nick / Arnoud
- **One-off data always need to be up-to-date as these are stored again every 6 months with each submission (the old one-off data stay archived)**
- Grassland data more complete than for other ecosystems
- Grazing type and period not accurate, only suited for simple systems, monthly data better
- **Plant species composition** often only available once. Needed where grass / clover mixture changes (Oensingen / Laqueille). For ProGrass model this is important. One-off measurements sufficient at other sites.
- Piana del Sele: spreadsheet cannot cope with two crop cycles / year
- Intercrop periods difficult to document
- Action wetland / shrubland: data for each species or general value?
- Action arable sites : There is lack of standardisation of pesticides and fertilisers (commercial names or active ingredient / composition), please edit this.
- Distinguish between nil entries and no entries.
- Action arable sites More info on **irrigation technique / tilling** techniques is needed. Drop down list of techniques?
- At some places zero returns would be more useful.

Grazed grassland management (Stephanie)

- Action Easter Bush, Bugac, Auchencorth : Should be in livestock unit ha-1 rather than cows ha-1.
- Action: Bugac: 400-500 dairy cows on 550 ha; submit same number for each day; improve numbers.
- Auchencorth: can't be more specific than 1 LU ha^{-1}.
- Action Bugac to find out about milk production/ time spent on field / additional feed (type & amount)
- Action Bugac Check plant tissue N concentrations for Aug/Sept 06
- Action Stephanie Bush data on potential productivity is in kg m-2 cut-1. Needs to be kg m-2 week-1, need to re-submit.
- Exclusion cages overestimate potential productivity, need to compare with estimate based on feed

Vegetation C & N (Stephanie)

- Data not yet analysed for Auchencorth, Borgo Cioffi, Grignon, Gebesee
- Tissue N similar at Bugac and Oensingen despite difference in N supply
- Action Laszlo to check first two N values (Sep 2006).
- Action Catharina? Wheat leaf tissue N at 5% quite high. Sugar beet higher than wheat. These data are for leaves only (not whole plant). Double-check data.
- Need to look into dynamics in relation to crop changes and fertilisation

NEU meeting 15th September 2009, 11:45-12:45

Activity 1.4 vegetation C&N (Ute for J. Schjoerring)

Plant N pool

- Preliminary data from Speuld were shown, no difference in C from leaf tissue of different heights.
- Mineral N seems to be greater in June/July/September when there was also a pH difference. Top needles were more acid
- Seasonal differences but NH4 and NO3 were not significantly different
- 1 year of samples enough for each site, so nobody has to sample any longer (done for EBu, AMo, Speuld, Soroe, Oensingen?)

Action all:

- Communicate with Jan to send him the samples
    - For transport you may try and use cool packs to prevent the frozen samples from defrosting during transport rather than dry ice.
- Stop sampling after one year
- Complete collecting data sets that have been started

LAI, canopy height (Catharina Don)

- data, different methods, how comparable?
- Action Catharina High values in summer 2008 in Gebesee, is this due to the angle the LAI meter was held?

- Action Benjamin Grignon some values wrong units
- Action Ana Castellaro, high values incorrect
- Acton Julia AMo data not yet processed

Biomass, litter, yield (Ana Meijide)

- For forests '**Yield, biomass**' only needs to be completed if there is management. In forests this may only be only every 5 years
- Action Nick There was management in Hoeglwald which has to be put in still (in week/month/seasonal)
- For forests yield is not 'Increment in wood' which is reported on spreadsheet 'annual'
- Above ground biomass also reported in annual sheet
- Action Sue? Standard deviation of biomass missing
- No data for wetlands but no cut. For wetlands is yield and litter the same? Not if woody species there, needs to be estimated.

Activity 1.4 litter decomposition (Ute for Ulo Niinemets)

- Everyone should have received litter from own site and a different sites to exclude influence of climate & soil
- C, N, C/N ratio already measured by Niinemets' group. They have sorted litter into fractions, analysed separately (dried samples)
- For forest monthly values, e.g Hyy sent samples for 1 year, now stopped
- Miguel's graphs: Better indicator than annual rainfall needed to establish relationship
- Sites missing from presented table: Oensingen, AMo, Hoeglwald, Lompolo..,
    - Oensingen and Lompolojankaa have never seen the e.mail asking for litter
    - Amo has not sent litter, there should be data from other vegetation sampling though because samples divided into dead and alive biomass to be used for gapfilling (Action Julia to check and find the data)
    - Hog litter is collected and analysed by a subcontractor (Action Nick : get the data)
    - Action for Annalea Lom needs to collect litter, measurements for 6 months and cover the seasons should be good enough, but start collecting now, before snow cover. Lom does not have real litter, but can take dead material from the plants

Arable sites: litter collection is not possible for any of the crops grown

Mark Sutton

Report from external reviewers/advisory group was circulated and discussed

- Annual reports by externals who are not involved
- Need to know that we are watched
- Fill gaps in data
- More aggressive management
- Make sure that deliverables met

NEU meeting 15th September 2009, 13:45-15:30

Soil NH4/NO3, NO3 leaching (Janne Korhonen)

- data incomplete; non-numerical data in numerical fields
- Sampling intervals for suction cup variable (Hyytiala 1 day, protocol says 1 month)
- How to we report data below detection limit?
- Empty cells, NaN, -999?
- Action Arnoud and Nick: No data for Speuld and Hogelwald
- Action Nick Hogelwald have now 2007 data but not yet submitted, still waiting for 2008 data
- Leaching rate is calculated offline by modellers, but soil nitrate solution concentration needs to be submitted; modellers prefer concentrations.
- At Hyytiala, Lompolojankka nitrate leaching is measured at catchment level from input and loss assuming no storage in soil.
- Soro make their own leaching calculation: (precipitation – transpiration) x NO3 concentration
- Methods for NO3 leaching:
    - At catchments level: in and outflow NO3 concentrations
    - Suction cups at 2 or more soil depth
    - Rhizon samplers at one depth (not suitable to calculate leaching rates)
- Action all make sure that the method used to determine NO3 leaching is correctly documented in the methodology section.
- Action Laszlo: Bugac units for soil NH4 incorrect (mg/kg rather than g/kg)
- Action Annalea Problems with Lompolojankka data file (extra values need to be deleted,)
- Action Julia Auchencorth soil NO3 – some high values
- Action Stephanie Easter Bush contains text in numerical cells and some large numbers in suction cup data – wrong units? (to check)
- Action Julia Soil water CH4 at Auchencorth without dates (to check).

Note that NO3 is reported as NO3 not as NO3-N etc.!

DON

- DON can be important at clean and non fertilised sites. e.g: At Hyytiala: NO3-N (0.08), NH4-N (0.24), total N (1.02) – run-off dominated by organic N. At Soro 47% of dissolved N is organic (spot measurements).
- Therefore measure total N and mineral N leaching at forests and wetlands
- Wetlands now measure DON
- Action Laszlo Bugac should check if DON measurements are possible (total N).
- Action Nick Total N at Hogelwald smaller than NH4+NO3, thus not reported.
- Hogelwald should find out how bad the total N measurement (submit inorganic/organic standard)

Soil N2O/CH4/CO2 fluxes (Annalea Lohila)

- **Negative fluxes must be reported and not be set to 0!**
- Action Ana Castellaro includes many 0 values (check if this is correct)

- Action modellers: DNDC currently does not include N2O consumption. Should get higher up the priority list, especially for grass / wetland / arable
- **Action to request from C3 that N2O uptake to be included in models**
- Action Nick Hogelwald only submits high frequency autochamber results. Autochamber Hoglwald in wrong units for 2007.
- Action Laszlo Bugac, last submission missing. Bugac data for soil CO2 sparse
- Autochambers: Speuld data still being processed. Auchencorth no autochamber; Borgo Cioffi no data available
- Action Stephanie: Not all autochamber for E Bush are in the database and some data are duplicated for both fields
- Action Albrecht Oensingen units of auto-chamber incorrect for N2O in 2007 and poor resolution in 2008
- Action Andreas Soro high variability of N2O and CH4 fluxes in 2008; stdev values seem incorrect (sometimes constant, sometimes same as flux value)

- **Long discussion on how to gapfill** N2O/CH4 data
- Modellers need gap filled flux data.
- Options to gapfill are
    - Neural network filling: No, this is only good for CO2 (Jagadeesh)
    - Hogelwald uses annual mean + linear interpolation

        - Multilinear regression equations, as done by Chris Flechard for grasslands (Greengrass, publication) were suggested.
        - Jagadeesh can provide multilinear regression equations from the submitted data, once the spreadsheets are all updates.
        - But every group should try there own, as they know there own sites best
        - Use Schauffler's regressions for potential emissions to gapfill?
        - Continue this discussin on how to best gapfill offline (Action Ute)

- Falge paper / Moffat paper on CO2 gap filling: quality of gap filling depends on how tight relationship is with drivers, exact method is of secondary importance
- Action all Modellers need info on spatial variability – standard deviation and min / max of flux chambers should be reported (comment from Jagadeesh and Marcel van Oijen)

Discussion on the synthesis of activity 1.3 work (lead by Mark Sutton)

Cross-cutting papers on missing / key factors, for working groups at Soloturn meeting:

- animals in soil / effect of earthworm activity on N2O
- Importance of organic N (inputs & outputs)
- Nitrification / denitrification
- Di-nitrogen loss & N_2 fixation
- Gap-filling approaches (Jaberdeesh/Aberdeen can provide linear relationship for all but wetlands)
- Compare response functions from lab work and in field (Andreas)

- Ecosystem specific synthesis papers

    - Grassland analysis (Christoph Ammann / Albrecht Neftel)
    - Forests (Nick, Andreas, Klaus)
    - Wetlands (Annalea, Julia)
    - Arable (Cellier, Loubet)
    - Overview (Ute)
- Site-specific papers:
    - Oensingen

Special Issues:

- Ghent special issue in AEEE out
- Gothenburgh special issue in European J. Soil Science in process
- Soloturn: Wim de Vries will lead one on Environmental Pollution
- Final meeting in Edinburgh: possibly two or three different ones (Atmos. Environ. / Climate Journal)
- Site specific papers need to come out over next 9 months.
- Synthesising papers written in 2010

- 4 years data sufficient, if you started late, need to continue
- Pool measurements can be reduced earlier than fluxes
- Need at least 12 months of TAG measurements
- Ute to make table for duration of different measurements by site

Action Eiko to circulate method for NOx gradient corrections after talking to Jan & Kim.

Minutes for Data quality meeting Edinburgh, Tuesday 15th September pm after coffee break

Synthesis

What papers should be written

- Focus N and greenhouse gas budgets
- Site based papers, first priority
- Ecosystem system level e.g. Swiss take lead on grasslands (Christof Ammann), present at Solothurn. Discuss uncertainties of N budget (missing N2). Discrepancies of NEE and soil C measurement, include N to compare.
- Another paper from Swiss (with Pierluigi); look at climatic change and how this affects budged
- Review on missing processes related to nitrogen that are not measured; Nitrifier/Denitrifier, organic nitrogen, total denitrification-N2, N2 fixation, animals in soil (earth worm activity). Someone needs to take the lead. With input of Bob Rees? Cross component activity.
- Gapfilling of non CO2 gas fluxes; CH4 and N2O. (To start Jagadish will use our data to use in regression model for all ecosystems apart from wetlands). Different approaches, uncertainties of each approach.
- Synthesis about budget including all ecosystems.

At next meeting (Solothurn) have special working groups to discuss each paper. If possible presenting at Solothurn.

Ghent special issue AGEE is out. Current special issue NJSoilscience, deadline passt. There will be a special issue Environmental pollution (Solothurn). There will be a last one (Edinburgh), or in different specialised areas; two or three journals.
Timescale; Site based papers should be submitted within the next 9 months, Solothurn should be about site based papers, first approach on synthesis. Latter part of 2010 will be focused on synthesis. Main aim at Edinburgh will be synthesis papers.
Volunteers needed to lead papers!

Discussion about reducing the measurement period from 4.5 to 4 years. Ideally 3.5 years (end of 2009). As otherwise there will be no time for writing up. This could be different per measurement; high priority to fluxes, less to pools. It also depends on when you have started with the measurements. If you want to stop after 4 years, you need to discuss it with Ute/Mark.

NEU meeting 15th September 2009, 16:00-18:00

Soil NO Fluxes by chambers (Ozone , NO2, NO) (**Nick Bruggemann**

No measurements reported for 7 out of 13 sites! Only Grignon, Hoglwald, Soroe, Speulderbos, Oensingen, Bugac have good data.
Data reported showed that Gri, Sor, Oen were sinks for NOx, but Hog and Spe were sources of NOx.

- Action Grignon, many missing values as 2008 has not been submitted yet.
- Soroe measurements started only in 2007.
- Action Oensingen some gaps, probably unit conversion problem (factor 1000). Dynamic chambers are not measured during winter (too much work).
- Action Bugac only NO concentrations submitted, NO2 and ozone are missing. Huge peaks of NO within the dry period, can these be explained?
- 2008 only very few data submitted as there was a problem with NO analyser. *Which site does this comment refer to?*
- Hytiala has measured zero fluxes for too long and has stopped the soil NO measurements

Easterbush huge problems with autochambers. Measurements only started in Aug 08, but fluxes have not been calculated yet.

- *Auchencorth* only by gradient as no money for chambers.
- *Castellaro* chambers not ready yet, hoping for 1 year measurements to be started soon. There are only a few days of gradient measurements at this site. But concentration measurements (Action Ana: is this correct?)
- *Borgio Cioffi* problems with instrument. There are no gradient measurements at this site at the moment.

Discussion on deriving fluxes from gradient Nox measurements at sites were autochamber measurements have not been carried out:

- Comparison made by Chris Flechard from chambers and gradients Amo were never very good.
- At Bugac comparisons were not good either as turbulence is excluded in chambers, problem with negative fluxes (1year of measurements).
-

NOx fluxes by micromet (Arnoud Frumau)

-NO concentrations on the flux sheet are submitted from all sites but NO concentrations in the ?? Sheet, only one site has submitted.

-NO concentrations lots of gaps. Grignon and Soroe not much submitted. Soroe measured since April 2008(?).

-NO fluxes need to be submitted from all sites, where available!

- Auchencorth and Lompolojankaa experienced a unit shift possible "shift" problem. At Lom the conversion problem in second half of 2007, close to detection limit or change of analyser.
- Speuld possible leak in system (check).

Ozone:

- Auchencorth there is a period with unit problem. EBu and Bugac some gaps.
- Oensingen some gaps. Grigon probably unit conversion problem in 2007.

NO2:

- Bucag missing data. Lompolo…same problem as for NO concentrations.

Method used to calculate NO fluxes

Does everyone know how to calculate fluxes, using correction for chemical reactions? At Grignon they have eddy correlation measurements. Correction algorism needs to be circulated; action Eiko to send CEH algorism to Jan Duyzer and Kim Pilegard, then it will be circulated to everyone.

Activity 1.4 potential N/C emissions (Ute for S. Zechmeister)

-*Potential N2O measurements* from soil cores incubated at different temperatures, paper submitted to EJSS (Schauffler et al); Surprising results; Wetland sites highest CH4 oxidation rates. Grasslands, why is Bugac higher than Oensingen? Hyytiala and Soro also have high CH4 uptakes. Once paper is published it would be useful to compare the data with our in situ measurements. (mistake in table description 20-80WFPS).

TOC vers total N, good correlation.

Characterisation of microbial population from soil samples from different sites. *Microbial community composition*; good relationship between C/N ratio to bacteria and fungi.

Data are available for us.

Ute for Dorien Kool

Activity 1.4.7 Distinguishing ..

Incubated soil; N2O production,, proportion of N2O derived from NH4 and NO3.. At all sites majority originates from NO3 apart from Bugac site. Huge difference between EB SW and NE site!

Ute for Sebastian Fontaine

Soil have to be sent to him by everyone.

Minutes Wednesday 16th September am, before coffee break

Ute for A.Venturi

Activity 1.4 soil fractionation

Results are available from C/N for all soils: agricultural fractions more homogeneous within soil layers than in other systems. Soil bulk density values for all sites available.

Teresa Bertolini
One-off data
Bugac and Hoegelwald no information at all.
Additional information has been added in additional columns.
pF curves:
pF curves are missing for wetlands, but not relevant for peatlands.
pF curves are missing for most sites, only Borgio Cioffi, Easterbush and Hyytiala have got the data.
pF curve is volume water content over pressure; two values, but there is only one column for it. The information is available as text, but that will not be downloaded together with values with data base report. Sue will add another column.
Soil depths between sites are different for each site. The reason is the depth is characterised by site and soil characteristics. The layers are not described consistently; layer 0-0.3 or just 0.3. Question if two columns are needed (e.g. 0 and 0.3), needs to be decided by modellers / Sue. Stdev missing.
Soil pH for Oensingen in last submission is wrong (17).
Grignon; *bulk densitiy* 1000x to high. The unit is strange "g m-3" instead of "g cm3". Units have changed from 2006 to the latest submission sheet 2009. Sue will change it for 2006, most people but right number despite wrong unit.
Speulder added a lot more information in additional columns which is not picked up by the data base, need to be included in data base-action Sue.

CO2 fluxes (frosts/arable/grassland/wetland)
Andreas Ibrom
Data quality parameter; random noise and systematic error.
Before the fluxes are submitted, there are several quality assessments to be done, but this could not be checked as only final flux data were submitted.
Data quality flags by 6 categories, 0 original data, 1-6 different ways of gapfilling.
Hoegelwald didn't submit any data. 6 sites have 100% coverage.
Sensible heat flux has no quality flags-why?
Spikes at Speuld and Easterbush.
U-star filtering seems to have only be applied to Soroe. Only filtered data should be submitted as 0 flags. Different from Carboeurope data base; there original and filtered-non gapfilled data were submitted but no gapfilled data. Carboeurope data base is being continued, data also accessible by non Carboeurope members. There is a Carboeurope gapfilling tool available for everyone, but depending on the specific conditions of certain sites, another tool might be more appropriate. In Nitroeurope there should be the information which gapfilling tool has been used; needs to be included into the methodology page.
Looking at data; Speulderbos something wrong with data in 2008.
Auchencorth, huge respiration at the end of 2008, needs to be checked.
Bugac, in 2007 no photosynthetic uptdake, only respiration, is possible if very dry, but could also be mistake, needs double checked.
Grignon problem with synchronisation (of what? Missed it)
Message; quality assess and exclude flawed data, check for u-star threshold, use defined flags-don't redefine. Report gapfilling methodology, report turbulence data post-processing, calculate annual budgets.

Annalea

Uncertainty for 30 min flux data

Uncertainty for 30 min data for fluxes is very complex and time consuming and might be misinterpreted, therefore it should be removed. From now on just leave the cells empty, but everyone has to go back to submitted data and remove the values.

Albrecht

Meterology grassland/arable;

data quality check has not been done due to lack of time/ unavailability of data base

Nick

Meterology forest/wetland

Speulder;Tbol strange maximum

Soroe; canopy wetness missing, not measured

Hyytiala 2nd half 2008 missing, rest complete. Canopy wetness not measured?

No canopy temp, bolt

Hoegelwald: some wrong net radiation values, have to be removed. 2nd half 2008 missing, will be submitted soon.

Auchencorth: Canopy temp? not reported, is it needed? No canopy wetness. Missed discussion about it… ask eiko. Pressure values wrong, needs to be corrected. There is a possibility that the units have changed in different spread sheets. Windspeed, one outliner, needs to be corrected

Lompolojanka: canopy wetness and canopy temperature missing

Comment from Albrecht; statistics should be included into database. Sue; this is high on the list of planned improvements

CO2 fluxes (forest / arable)

- CO2 fluxes submitted for EB and AU not u* filtered.
- Different strategy for CarboEurope and NitroEurope in flags. There should not be any dubious data with flag 0.
- Speuld data problem July 2008
- Hyytiala submitted modelled paper for 2nd half 2009.
- Auchencorth 2009 site changes to source – is this reasonable.
- Homework:
    - Review data with data flag 0.
    - Check u* filtering (at least for forest).
    - Report gap filling algorithm
    - Reort / harmonise turbulence data post-processing (spectral corrections, u* filtering, Webb correction?)
    - Look at integrated fluxes to spot potential problems.
    - Look at flux components (respiration / photosynthesis)
- Should we submit monthly average fluxes?

- Canopy temperature should be reported, can be derived from longwave radiation
- Auchencorth: spike in wind speed; step in pressure (wrong units)

Leaf wetness (Andreas Ibrohm)

- Needed for surface resistance parameterisation of reactive gases
- Problem: usually measures sensor wetness rather than leaf wetness
- Measures wetness, not conductance
- Can get bulk canopy conductance from Penman-Monteith equation, high conductance in wet conditions; need to correct lE very carefully
- Plot bulk canopy conductance vs. VPD to derive canopy storage capacity
- Cannot capture dew formation;
- Can be modelled w/o latent heat flux (Chris) from LAI, radiation, temperature, RH, worse for forests?
- Chris' model can cope with proxies to derive leaf wetness
- Wetness grid should be installed at all sites to validate Chris' model at Level-3 sites.
- Modelled leaf wetness should not be captured in database

Wet deposition (Laszlo Horvath)

- Description of chemical analysis technique not captured on current templates.
- Methodology line 60. 'Bulk wet deposition' should read 'Bulk precipitation amount'
- Some stations collect for 1 month or longer (problems with NO3-NH4 conversion, bird droppings, plant residues, insects).
- Deposition values in g N m-2 yr-1 should not be averaged directly, but should be weighted. It would be easier to report in g N m-2 period-1, in which case we can sum.
- Monthly bulk precipitation amount redundant
- Monthly stem flow and throughfall not captured
- Snow depth only reported by 4 stations
- Auchencorth only precipitation amount, need to add wet dep.
- Auchencorth, Grignon, Hogelwald, Piana de Sele have not yet reported any wet dep. data, mostly due to delays in chemical analysis
- Easter Bush reports very high deposition, probably incorrect units.
- Speulder Bos data are extremely low, probably incorrect units
- Lompollojanka is low, but this might be true
- At Hyytiala bulk wet dep is higher than throughfall, which is suspicious. Should only be higher if uptake larger is dry deposition.
- At Soro the stem flow deposition of NH4+ seems too high.
- At Speuld, extremely low bulk wet deposition data compared with throughfall.

Water table, soil moisture & temperature:

- water table height for Amo and Lom reported with opposite convention.
- Soil water content at Amo not continuous, but bi-weekly manual measurements
- Soil water content at Amo reaches 100%, which is not feasible, indicating that at high SWC, water table height is more meaningful & reliable

- Need to check what the wetland models (COOP) needs; **Action Annalea & Julia** to communicate with modellers.
- Ebu has some wrong soil T data in file (DIV/0); Bug warmest, Ebu coldest
- Ebu range in SWC too large (negative values & >100)
- Hyy minimum SWC seems too low (0.11%), could be frozen ground or could be submitted as fraction for some periods and % for other periods.
- Sor SWC data for one year faulty; treat with caution; will be removed from the database.
- Default measurement depth on template need to be adjusted as these are imported by the database (**Action all**)

Data management (Sue Owen)

- Ralf Kiese really needs N2O data for arable and grassland
- **Action Sue** to warn the modellers of limitations / faults in current datasets
- Submission will only deal with complete workbooks
- Maintain complete workbooks for up-to-date uploading, e.g. of delayed data
- Keep to submission period for each workbook, data outside the window will be rejected
- Submission dates: 31 May 07 (Aug – Dec 06) etc.
- Current template is V4.1, but V4.0 is also compatible
- New worksheets for individual sites added
- New template will be V5; Sue will update all data to V5 which will be posted on the portal; these should be used as the most recent data
- Base amendment on most recent template versions on website (you need to download your own data!!!)
- Don't use: -, _, -9999, #DIV/0! or text in number fields
- Detection limits are an issue for soil analysis, wet dep, N2O chamber fluxes; need to resolve how to report offline
- NaN is accepted and turned to empty cell
- 0 is stored as 0.
- Preference: no data or unusable data – leave empty
- Date format: DD/MM/YYYY HH:MM
- Only one row of data with the same date-time
- EXCEL data at midnight can be funny (wrong date)
- After upload (< 5 min), download the error report (e.g. use 7-zip as free software)
- After download, click 'save but do not submit' – now in temporary area – while checking and dealing with error report
- There may be 'out of range' messages – highlight unusual data, not rejected just highlighted
- **Action Sue** to post error reports from previous upload for checking.
- Changes to database upload:
    - Extra data fields
    - Comments from most worksheets in the workbooks
    - We exceeded 1000 individual data fields
    - All attributes (standard devs. Some extra measurement dates etc.)
    - Each template needs to be uploaded to three independent forms:
        - C1L3_Metadata_One_offs_Annual_V4.1 (1 min upload time)
        - C1L3_methods_Comments_V4.1 (1 min upload time)

        - C1L3_Time_series_data_V4.0 (depends on errors average 5-10 mins upload time)
    - Averaging function, average & group function for average diurnal cycles,
- Look at guide 'C1-C3 guide to reporting data' on website
- Downloading a graph should trigger a message to the data providers (**Action Sue** to check)
- Only Sue is allowed to insert new columns into the template !!!!!!!!!!
- Updating data:
    - Work from V5 template on the portal.
    - Update the data.
    - Send email to susa1@ceh.ac.uk or neudata@ceh.ac.uk, stating site, database form (see above) & submission data and ask for the previous submission of this form to be rejected.
    - Now these data can be uploaded, choosing 'Overwrite' rather than 'Append'
- In the future, templates will not be kept on the portal. The database is the official version.
- Old data in new V5 templates will be available for download from Mon 21 Sep
- 25-27 Sep – database will be offline
- Upload from 28 Sep onwards by 1 November.
- Add comment column to 30-minute met sheet.
- **Action all:** Send Ralf N2O data (Ute clarify in minutes)

Dry deposition fluxes (Chris Flechard)

- CDRY, (Canada), CBED (UK), IDEM (NL), EMEP
- Rc models, except for NH3 treatment in CBED
- Monthly concentration data from DELTA
- NOx and org N not accounted for
- Periods 2007-08 (depending on met & chemical data availability)
- DELTA data should be submitted to database by labs
- You can contact local lab, Sim or database for data.
- Lompolojankka: precipitation missing for half of 2007
- NOx deposition still needs to be estimated, add to modelling exercise.
- Need to improve estimates of compensation points based on NH3 flux measurements
- Probably better to use compensation point approach as state-of-the-art

Special topic NH3 measurements (Albrecht Neftel)

- More data in literature than in database.
- Two intercomparison exercises
- Flux measurements at several sites for testing of DELTA modelling
- Cross-correlation function worse for NH3
- European database of compensation points
- Paper on revision of emission factors for fertilisation?
- 40-60% loss of applied inorganic N, more recent values indicate smaller values. Losses at field scale expected to be smaller than

- Most of gradient systems have inlet problem
- Review paper on technical aspects of ammonia flux measurements
- **Action Eiko** to reserve slot for NH3 working group at Solothurn meeting.
- Eventually, highly resolved NH3 flux measurements (Speuld, Borgo Cioffi, Soro, Auchencorth, Easter Bush, Oensingen, Grignon)

Leads of integrated