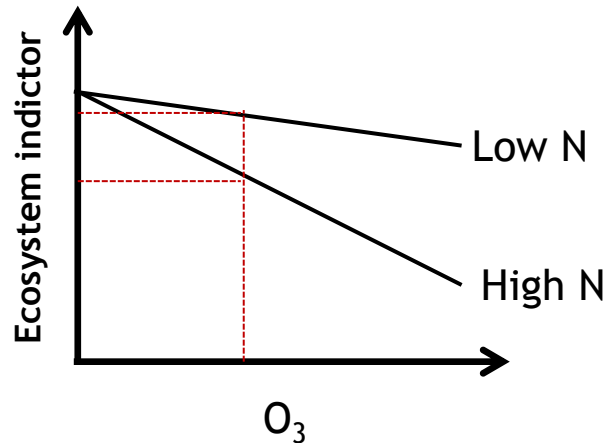# C3 deliverables for coming year

What are the effects of combined air pollution and climate change on ecosystems?

Deliver : Novel thresholds/tipping points
          Dose-response relationships

Graph: Ecosystem indictor (y-axis) vs O_3 (x-axis), with two declining lines labeled "Low N" and "High N"

1. Biodiversity (functions used) *****
2. C sequestration (NPP/biomass for trees & grasslands) *****
3. Resource use efficiency
    N, water, CO2 ****
4. Yield – for crops, timber production ***
5. Air quality (and consequences for health) – reduced uptake, BVOCs, ecosystems***
6. Ecosystem stability - Functional responses /functional types
7. Implications for climate etc.

C3 sessions discussed next stages in data mining, experimental and modelling needed to achieve these deliverables
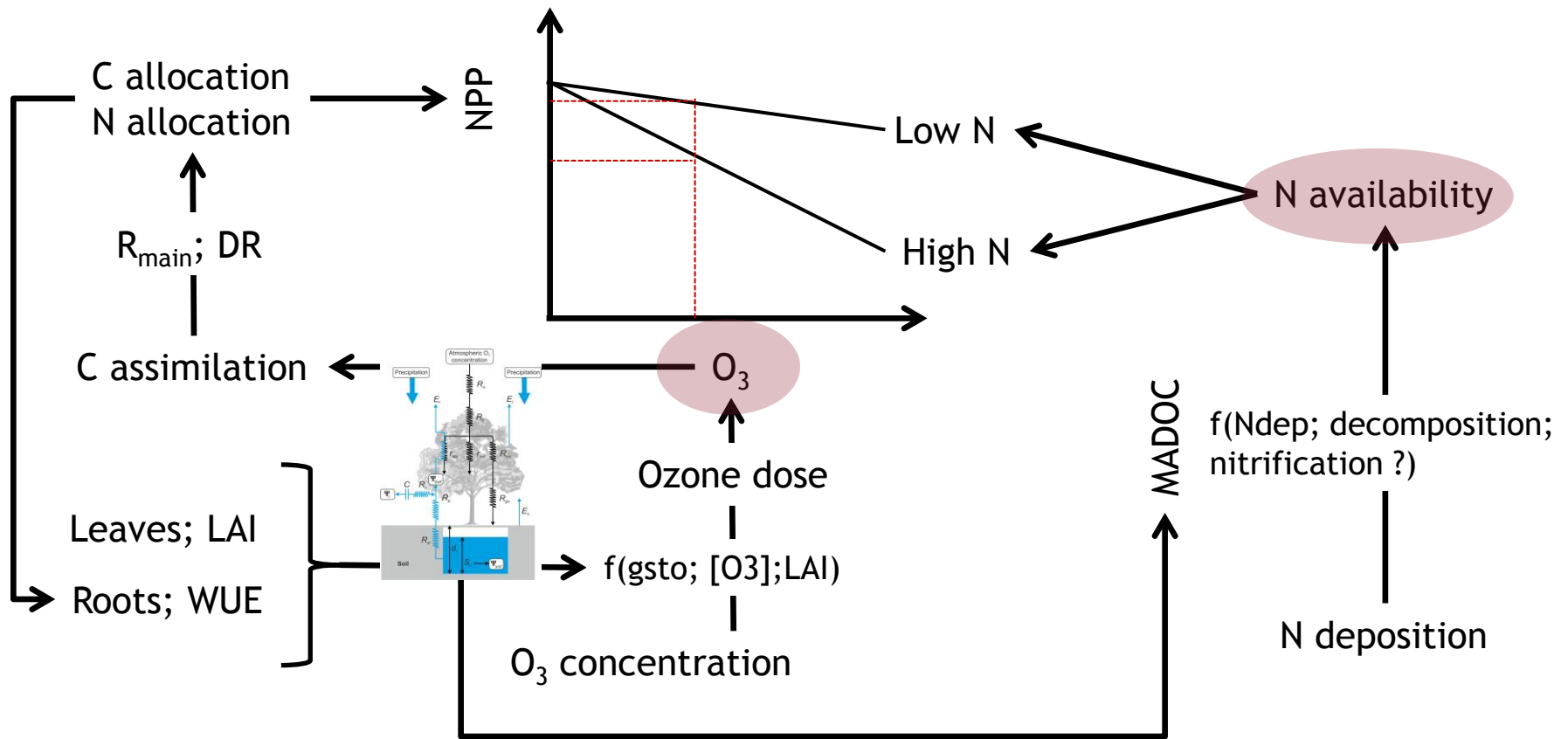
Data supply for modelling

2013 New Experimental Data (5 groups)

Country	Vegetation	O$_3$	N	Climate change
Spain	Leafy vegetable crops	√	(2014)	
Italy	Trees (oak and hornbean)	√	√	
UK	Trees (birch)	√	√	
Denmark	Heath	√		√
UK	Bog	(2014)	√	

Common measurements
• Stomatal conductance;
• Pn; A-Ci; A-Q;
• biomass/growth,
• leaf N/chlorophyll

Less common measurements
• Greenhouse gas fluxes,
• DOC;
• species cover
• (+ many others)

Leaf-scale experiments
BVOCs, aerosols etc.

Literature-based data mining
Next phase database to be completed by end of year

ICP Forests
Further analysis of subsets of data

Model development stage 2: data priorities, O3/N/CC effects

DO3SE/FORSPACE-VSD+/JULES

- Vcmax, Jmax, Asat
- Dark respiration
- M or g1
- C (and N) allocation
- Leaf N content
- O3 conc based ; meta-analysis by groups

For JULES,
- Updated functional types functions**

MADOC

- ❑ NPP (biomass as surrogate?)
- ❑ Senescence
- ❑ Leaf C:N ratio-
- ❑ Shoot:root (from expts in big pots/open field?)
- ❑ Combined functions for species and habitats
- ❑ Annual time step (growing season PODy would be OK, dormant season could be 0)

- Meeting needed once functions available – end of January - after ICP Vegetation TFM

Model testing

MADOC-type modelling

small number of sites with long time series and biomass/NPP

- identified by end of November;
- data extraction for modellers Jan/Feb

for DO3SE –type modelling:

Daily profiles of gs, Pn,

Leaf temp data

Sub-sets of data identified for testing of model

Effects data to test model

For C3, by end of year:

➢Models finalised

➢Model runs

➢Response functions and tipping points

➢Policy statements derived from scenario runs

    e.g. if O3 rises to X, N is Y and climate is Z, then xxxx is expected