



Studies on the Hesse Forest

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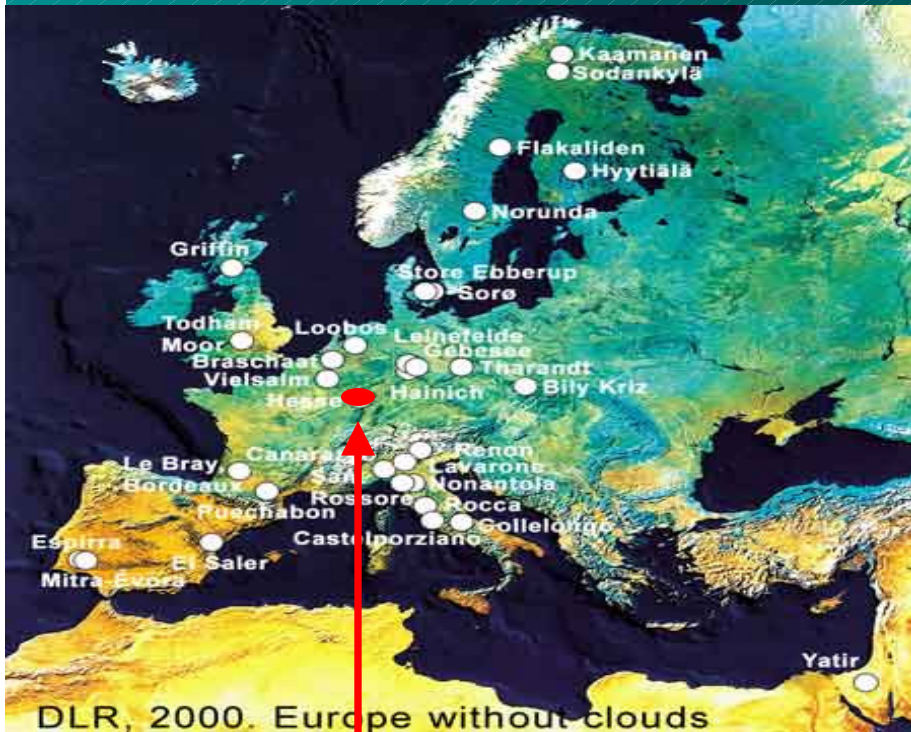
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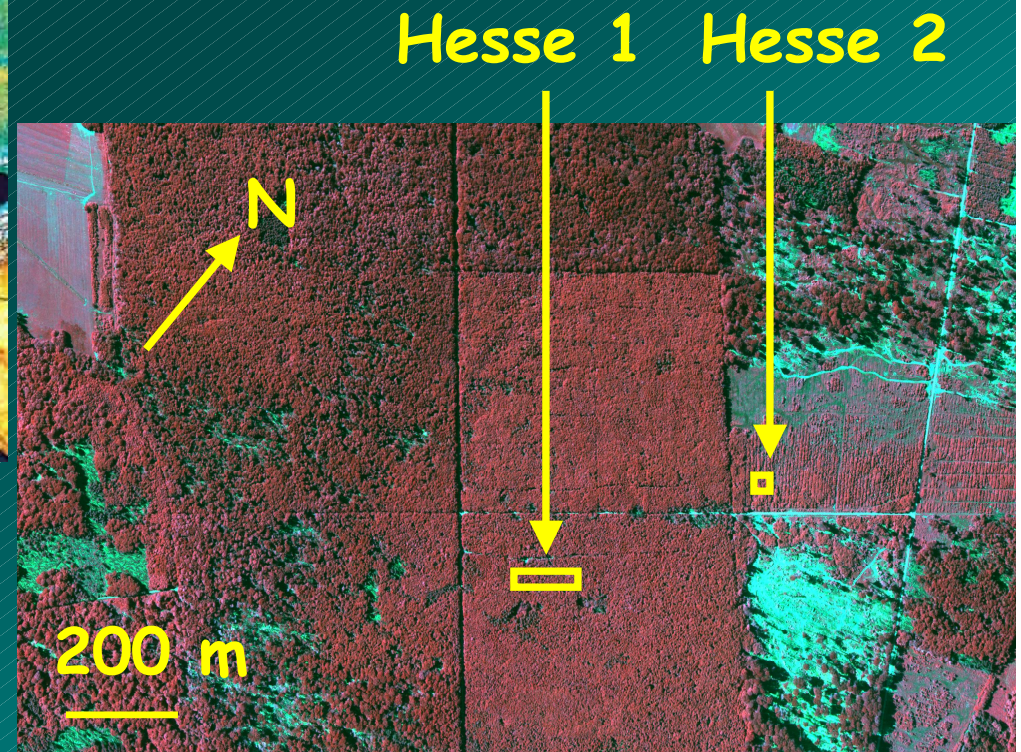
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STUDIES ON THE HESSE FOREST

LONGDOZ B., GROSS P., BRÉDA N., ÉPRON D., GRANIER A.



Hesse $48^{\circ}40' N$ $7^{\circ}05' E$
North East of France



Hesse 1

Beech stand
(90%)

Age: 35 years

Height: 18 m

Since May 1996



Hesse 2

Mixed Broadleaf
(beech, hornbeam,...)

Age: 12 years

Height: 6 m

Since October 2001

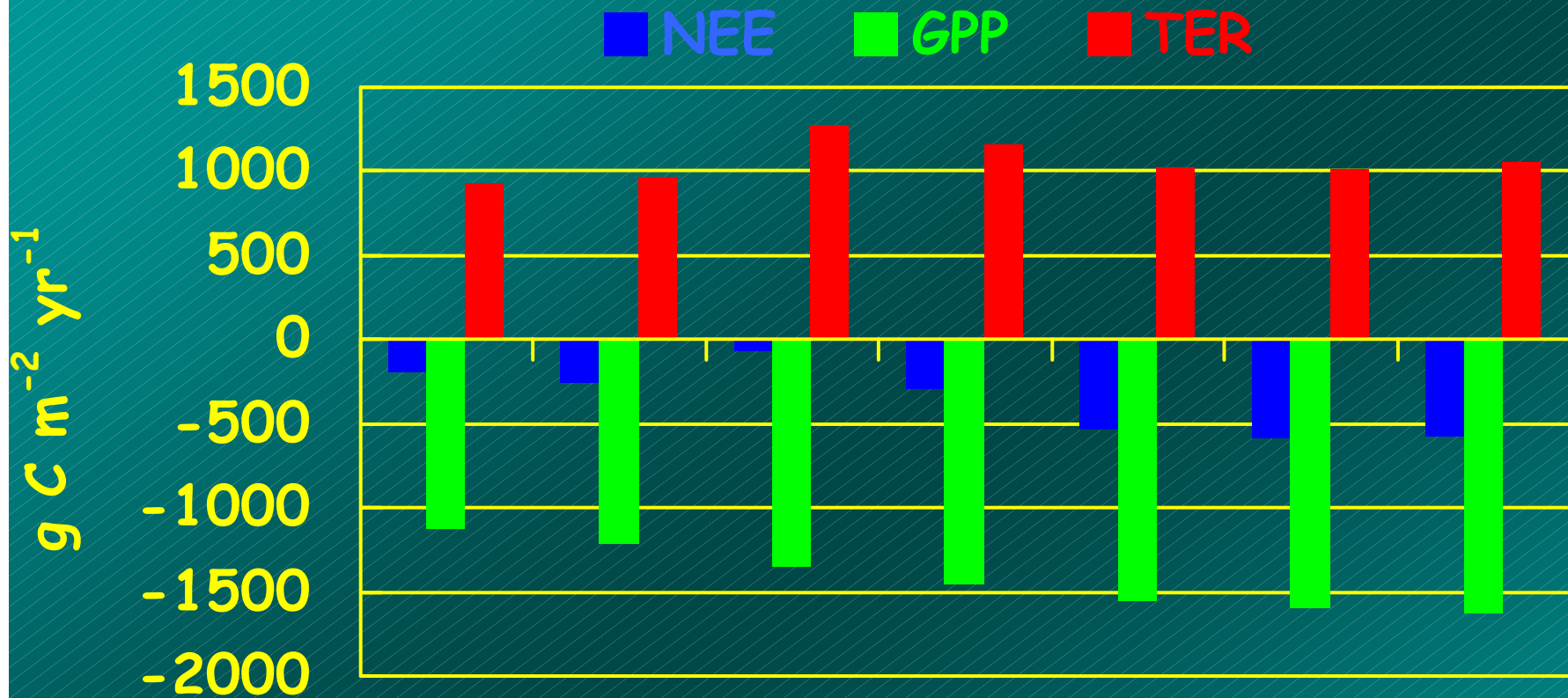


TOPICS

- 1. Inter-annual variability
- 2. NEE vs. biomass increment
- Hesse 1 3. Night fluxes
- 4. Footprint
- 5. Water balance

Comparison Hesse 1 - Hesse 2

1. Inter-annual variability



1996 1997 1998 1999 2000 2001 2002

NEE: 68 → 576 gC m⁻² yr⁻¹

Nbr of days with θ_s stress

+

LAI

=

72% of the NEE variance

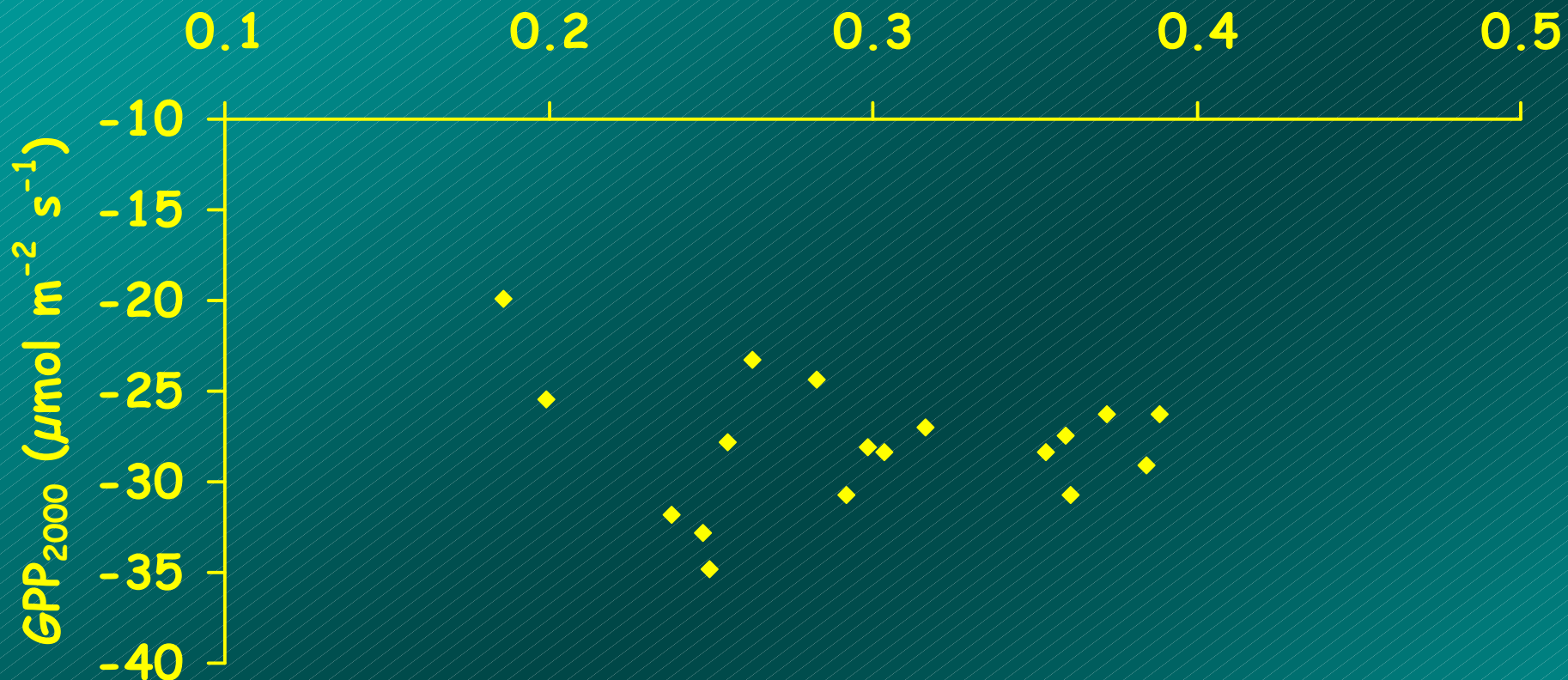
CV

GPP: 13%

TER: 11%

GPP

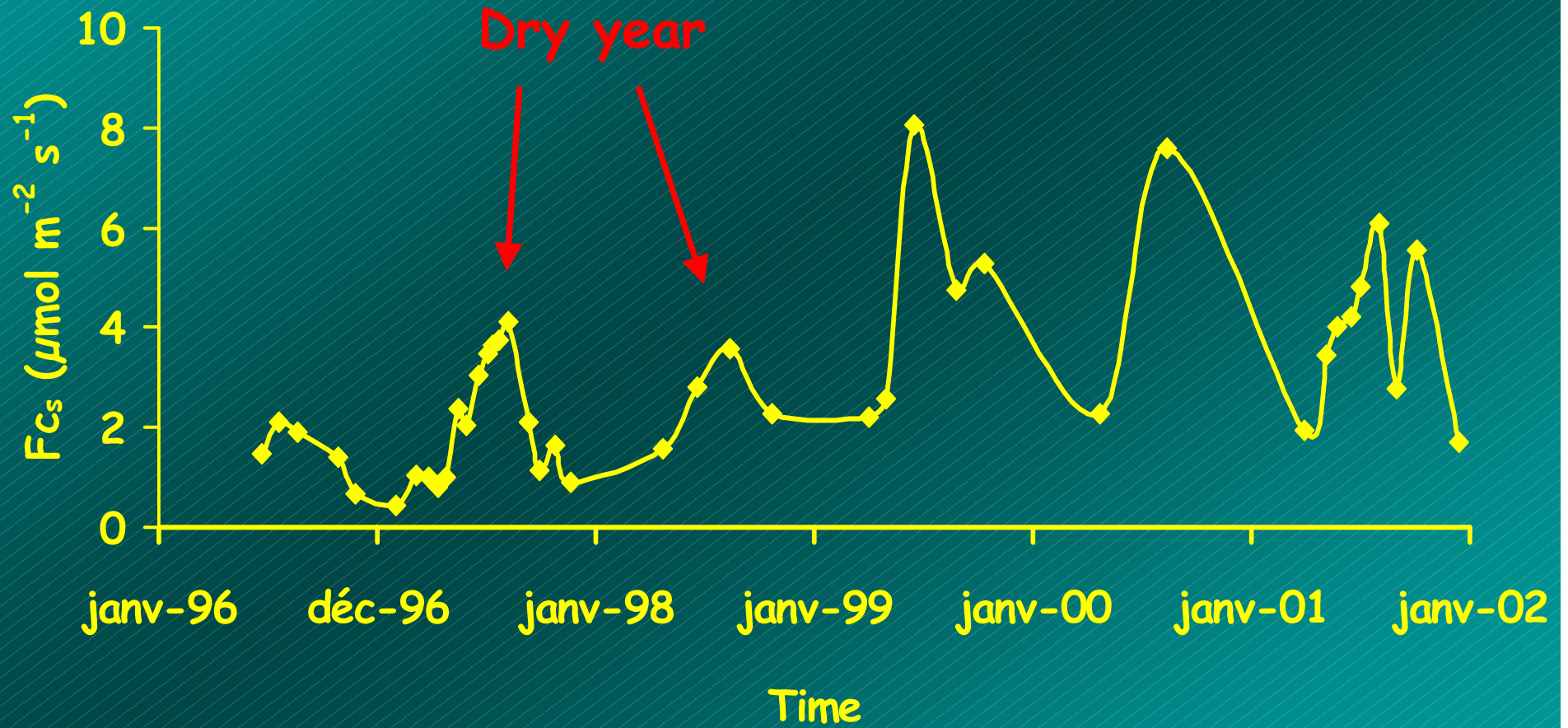
Soil water content ($\text{m}^3 \text{m}^{-3}$)



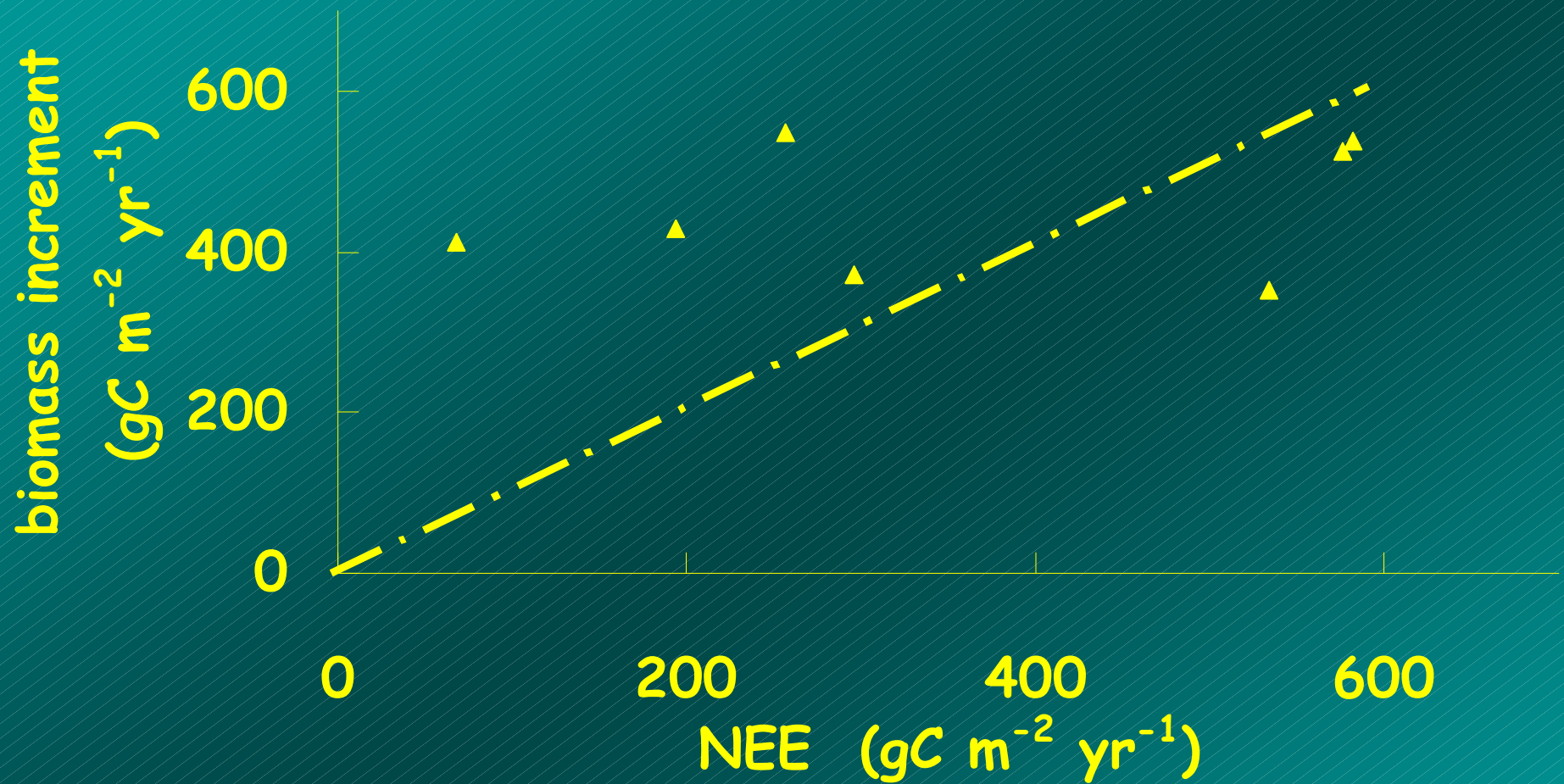
Month	May 2000	June 2000	July 2000	August 2000	September 2000
GPP_{2000}	-28.6	-27.5	-30.7	-27.0	-25.2

TER

Soil CO₂ efflux F_{c_s}

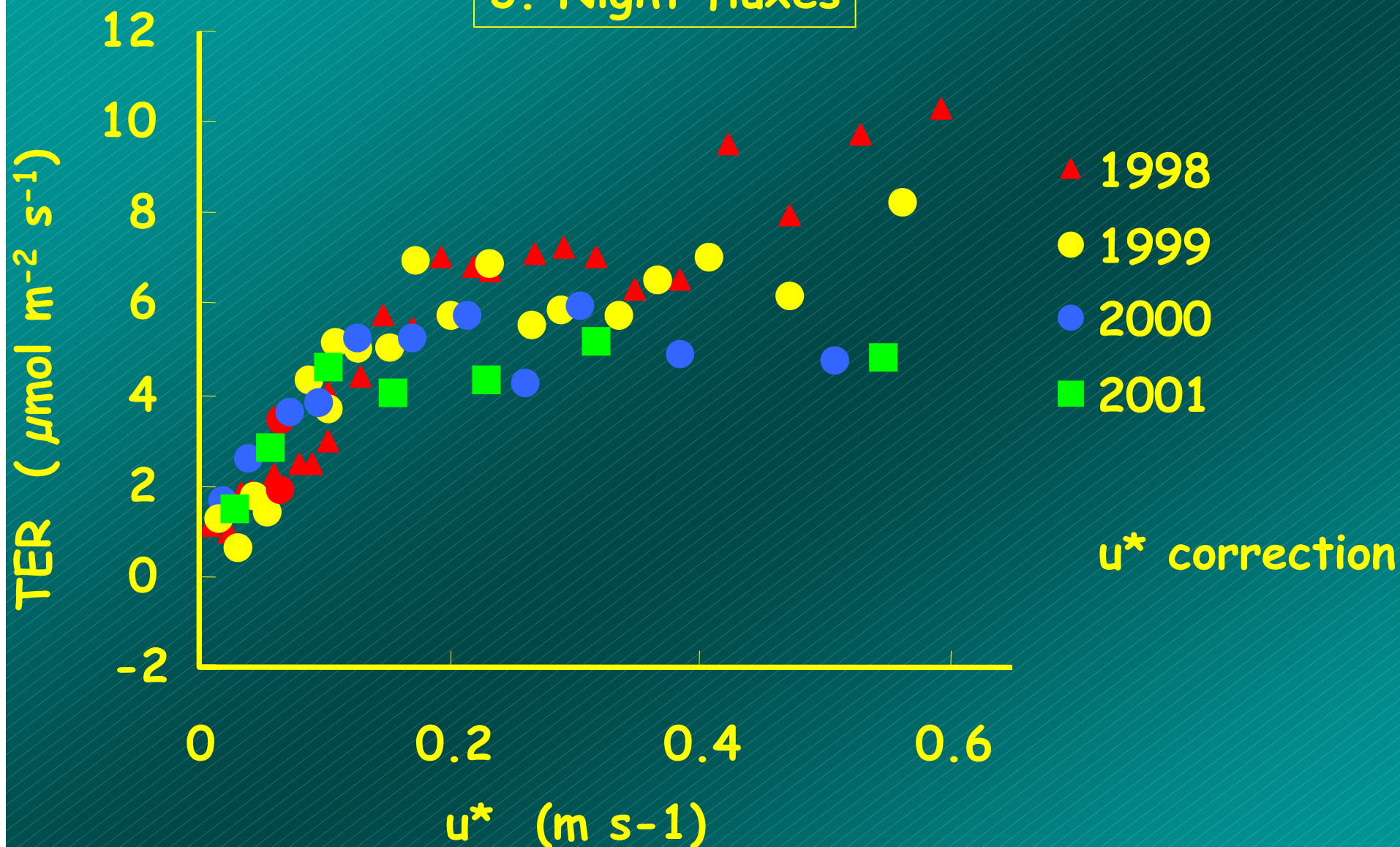


2. NEE vs. biomass increment



Bad agreement : root biomass increment, night fluxes,
footprint, coarse debris decomposition

3. Night fluxes

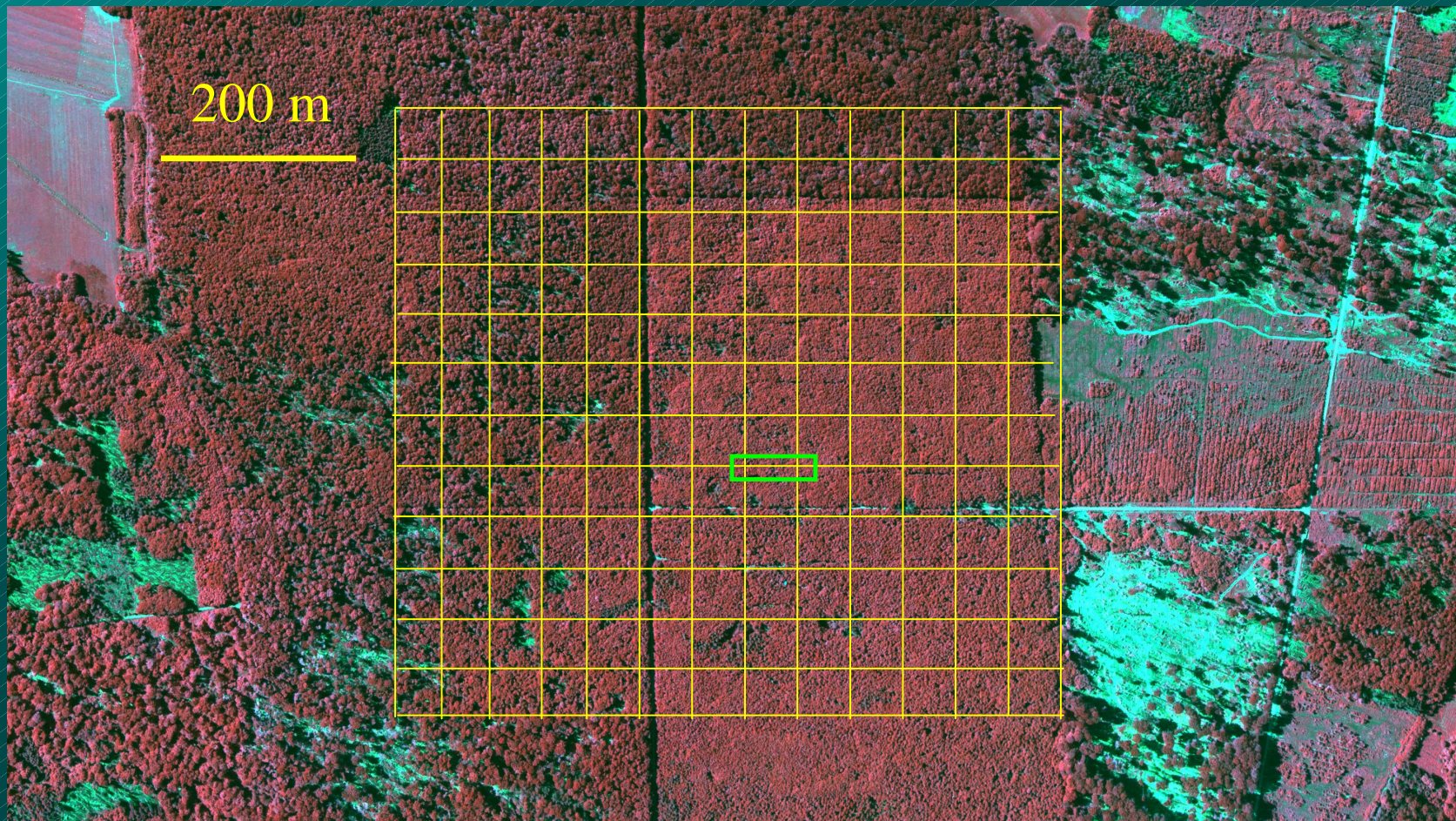


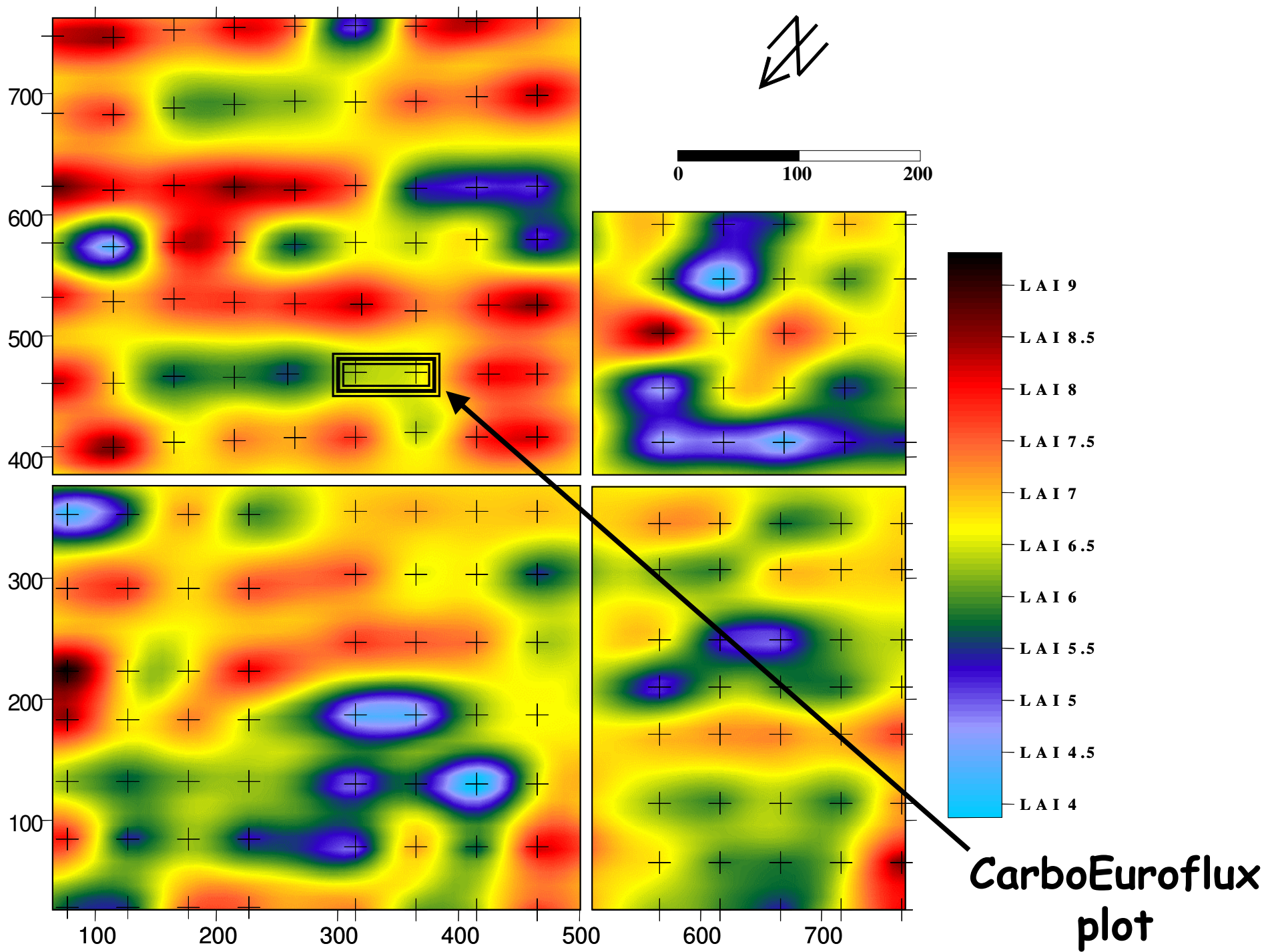
Summer 03: Measurement of the horizontal advection flux
(FUSAGX, M. Aubinet)

4. Footprint

Extension of sampled area for ground measurements :
stand structure, biomass, LAI, soil properties

Grid (50m $\times$ 50m) 200 plots



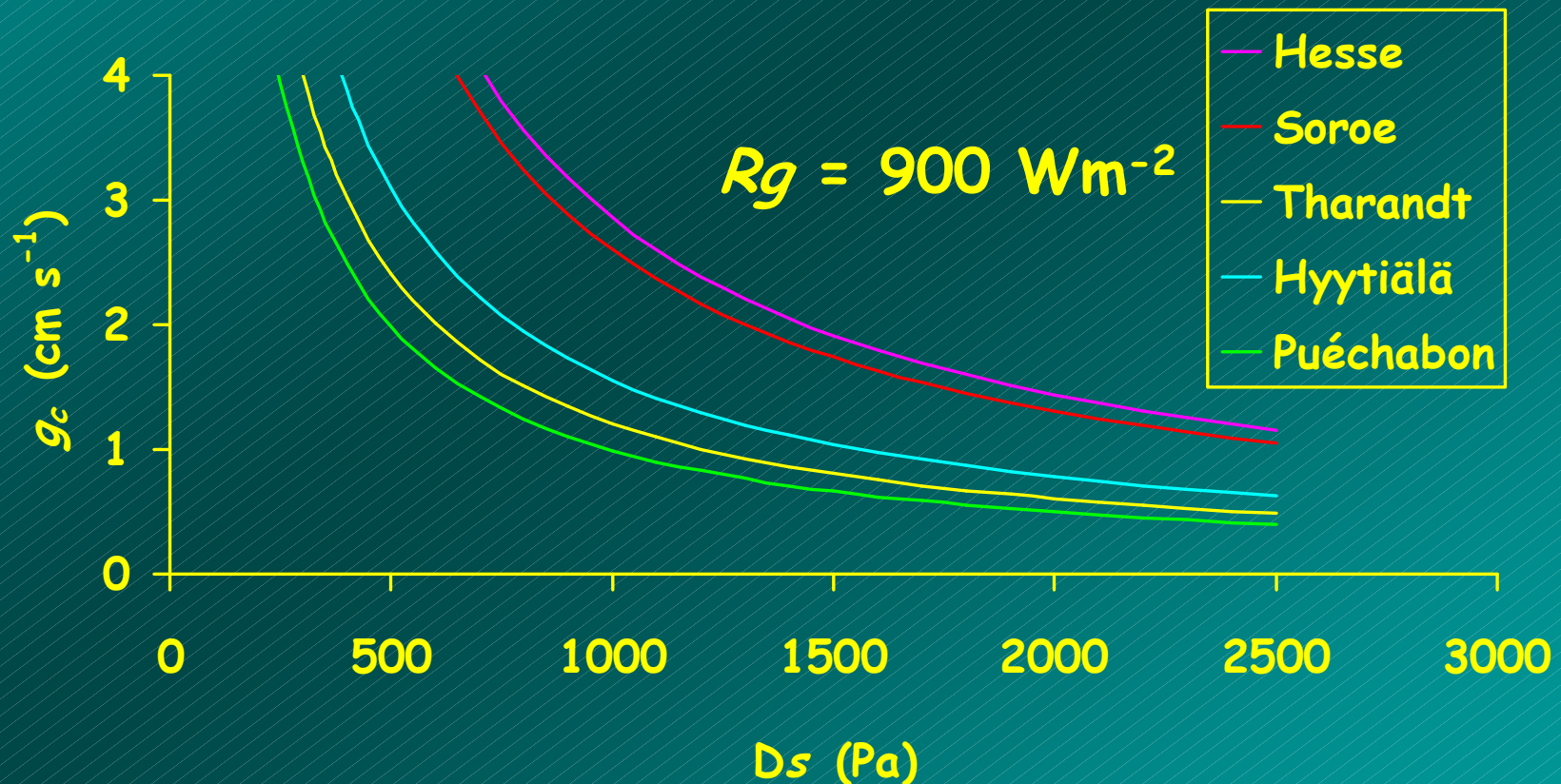


5. Water balance

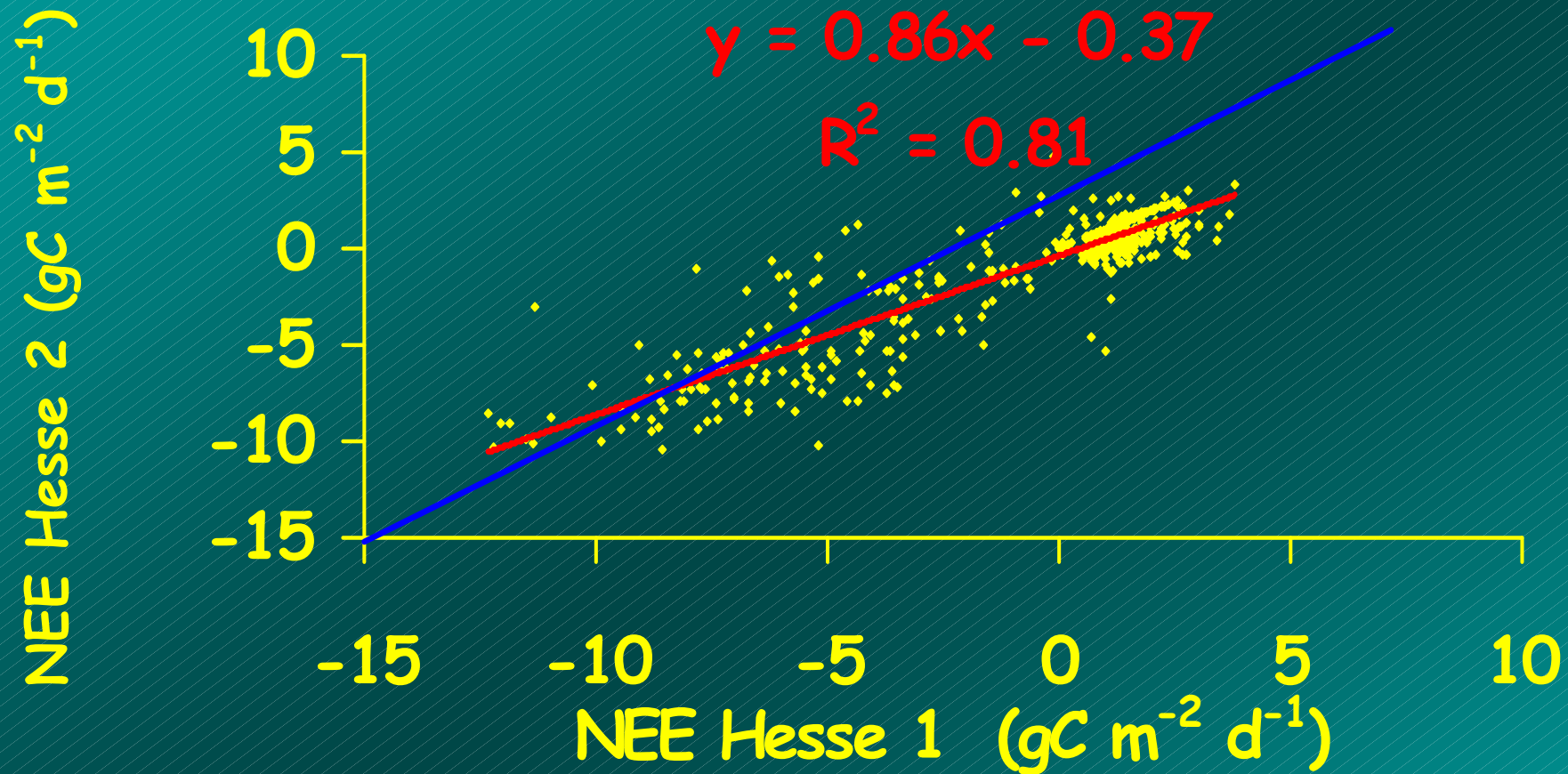
Study of g_c (link between CO_2 and H_2O fluxes)

Calculation of g_c by inversion of Penman-Monteith

parameterisation : $g_c = \frac{Rg}{Rg + Rg_0} \cdot \frac{Ds_0}{Ds + \alpha \cdot Ds_0}$ $R^2 \text{ } 0.44 \Rightarrow 0.55$



Comparison Hesse 1 - Hesse 2



Lowest GPP and TER for Hesse 2 (youngest ecosystem)
Data still under process

Perspectives

- Analyse of the inter-annual variability :
Used of half-hours data
- Scaling up + net flux decomposition:
Leaf, soil and aerial wood $\Rightarrow$ EC measurements
CHANCE model
- Measurement of F_{c_s} in representative plots ($TER - F_{c_s}$)
Experiment on coarse debris decomposition
- Night fluxes :
horizontal advection measurements