

Carbon sequestration by a temperate sedge-grass marsh

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Carbon fixation by wetlands

- Important role of wetland ecosystems
- Various types of wetlands differ in their carbon budgets
- Environmental determinants:
 - hydrological regime
 - nutrient availability
- Management practices
 - modification of environmental determinants
 - biomass removal (in the form of harvest).

Role of vegetation

- Ecosystem component responsible for inorganic C fixation
- The vegetation status needs to be considered in studies of carbon budget.



Aims

1. Quantify main carbon fluxes in contrasting hydrological conditions
2. Relate the rates of C fixation to vegetation status
3. Estimate the role of methane in total C emissions

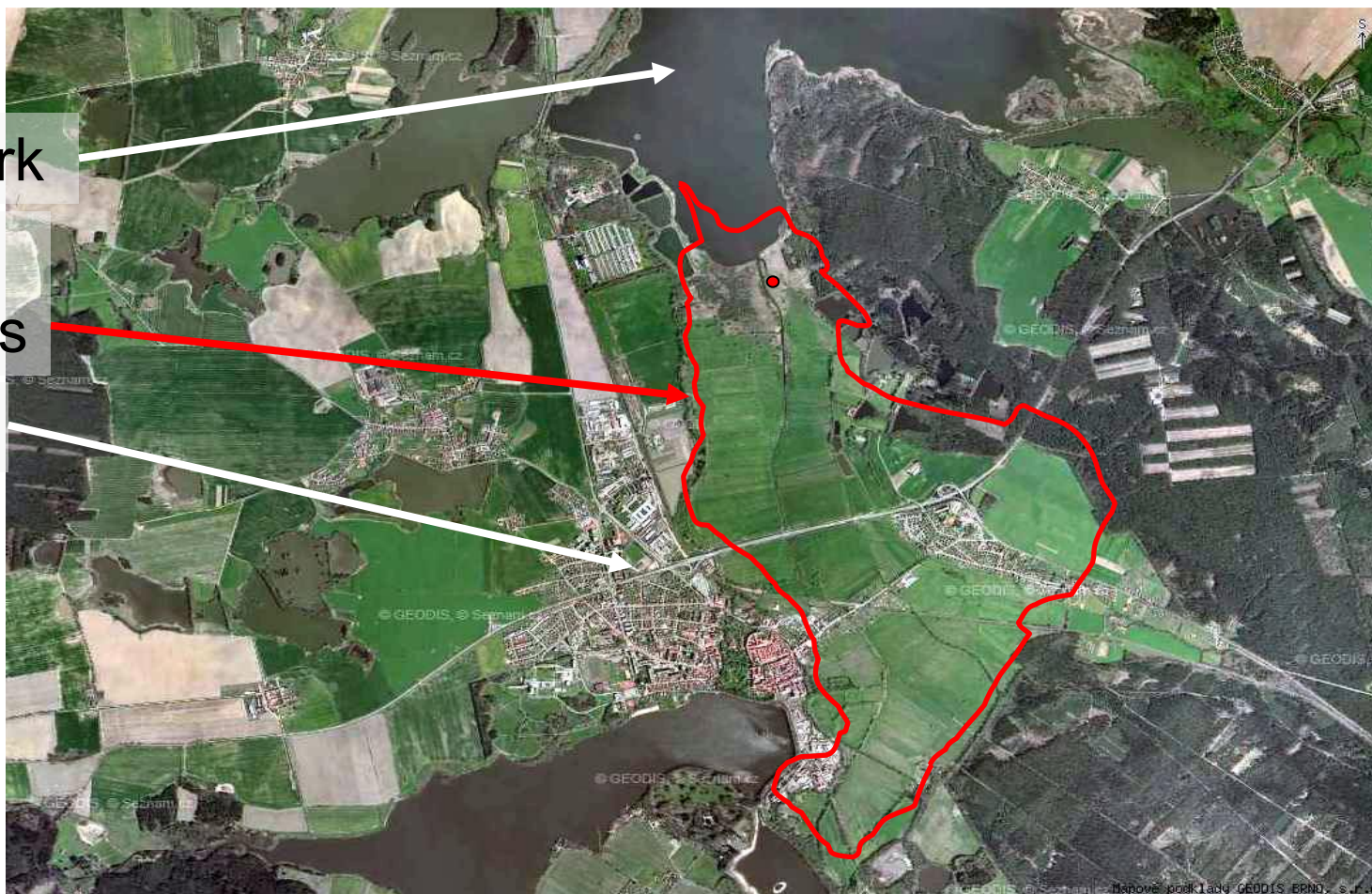
Wet Meadows

Třeboň Basin Biosphere Reserve, Czech Republic

Rožmberk

Wet
Meadows

Třeboň



Habitat

49°05'N , 14°46'E

Altitude: 428 m

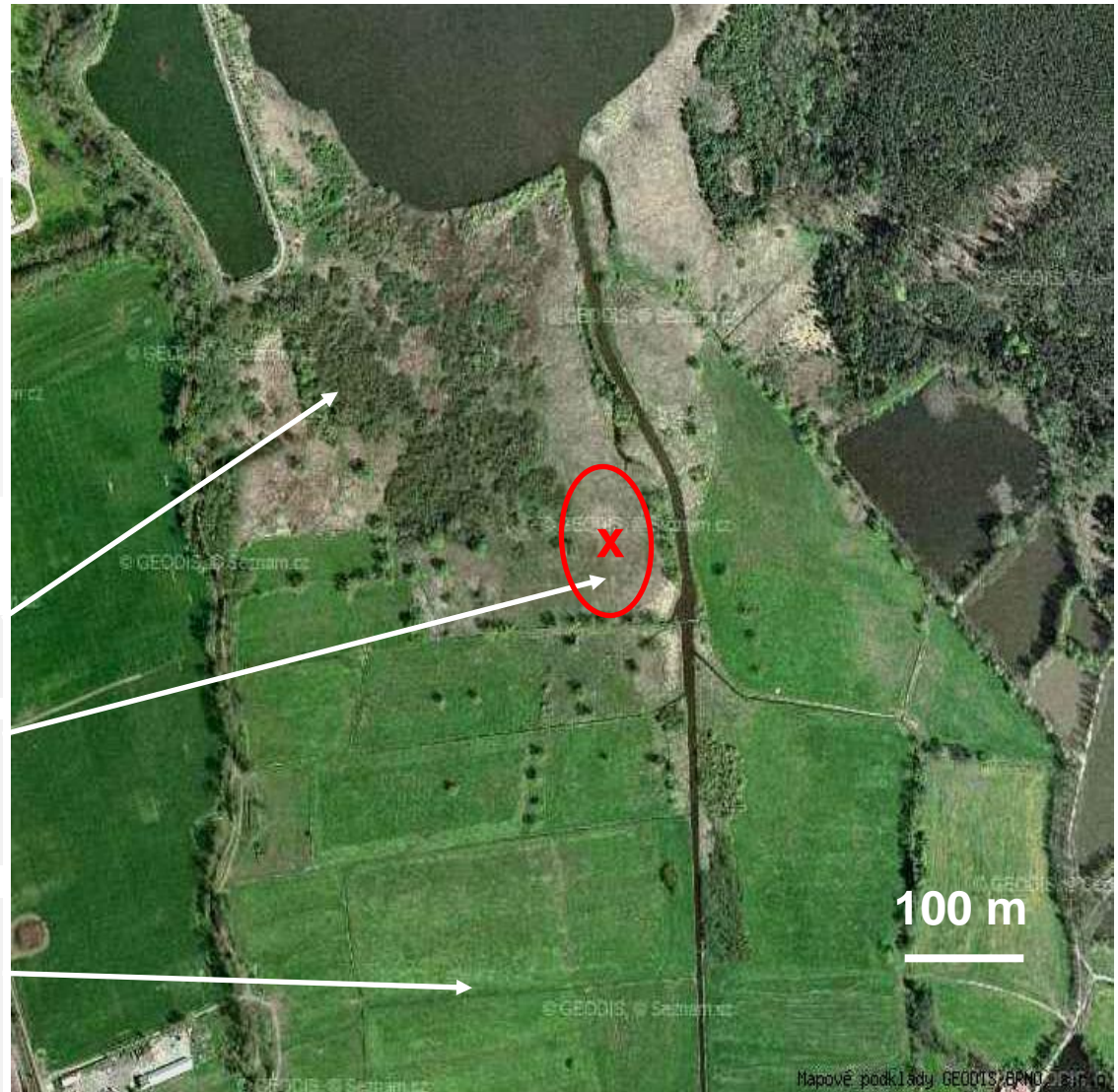
Mean annual temp.: 7.4 °C

Ann. precipitation: 620 mm

Willow carr (*Salix* spp.)

Unmown sedge-grass
marsh (*Carex* spp.)

Mown wet meadow: reed
canary grass (*Phalaris
arundinacea*)



Data collection

Meteorological measurements

- EMS Brno, CZ

CO₂ fluxes: Eddy covariance

- 3D anemometer (Gill, UK)
- IRGA (LI-COR, USA)

CO₂ and CH₄ emissions:

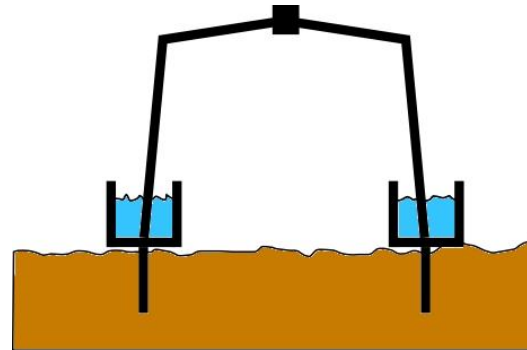
- Laser gas analyzer (Los Gatos, USA)



Data collection

Closed chambers

- Automatic operation
- Continuous measurement
- Temporal variation
- Manual operation
- Portable
- Spatial variation

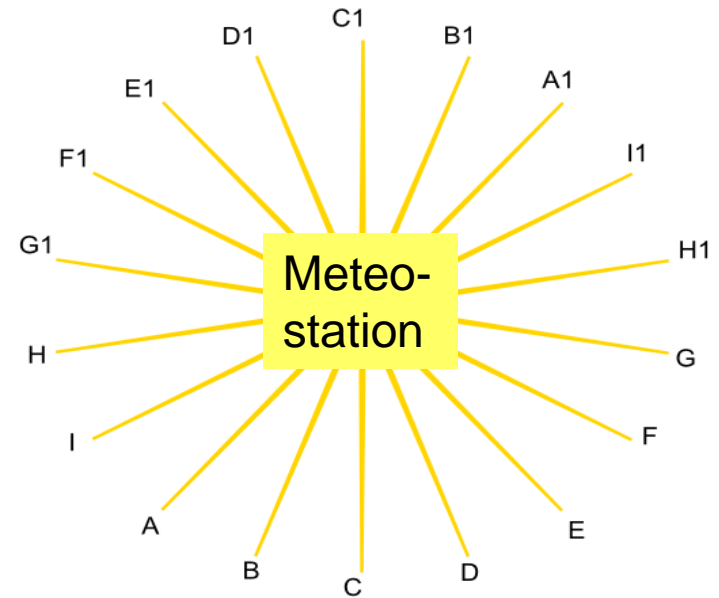
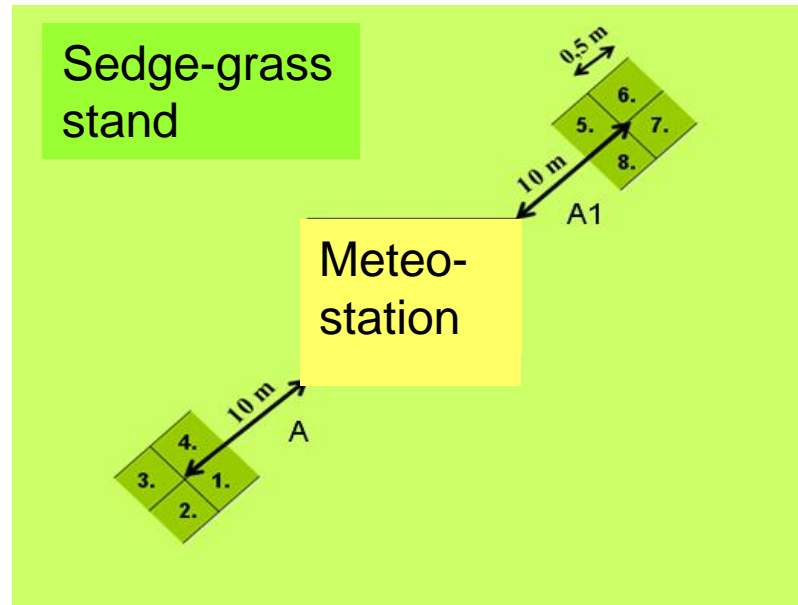


6x with plants

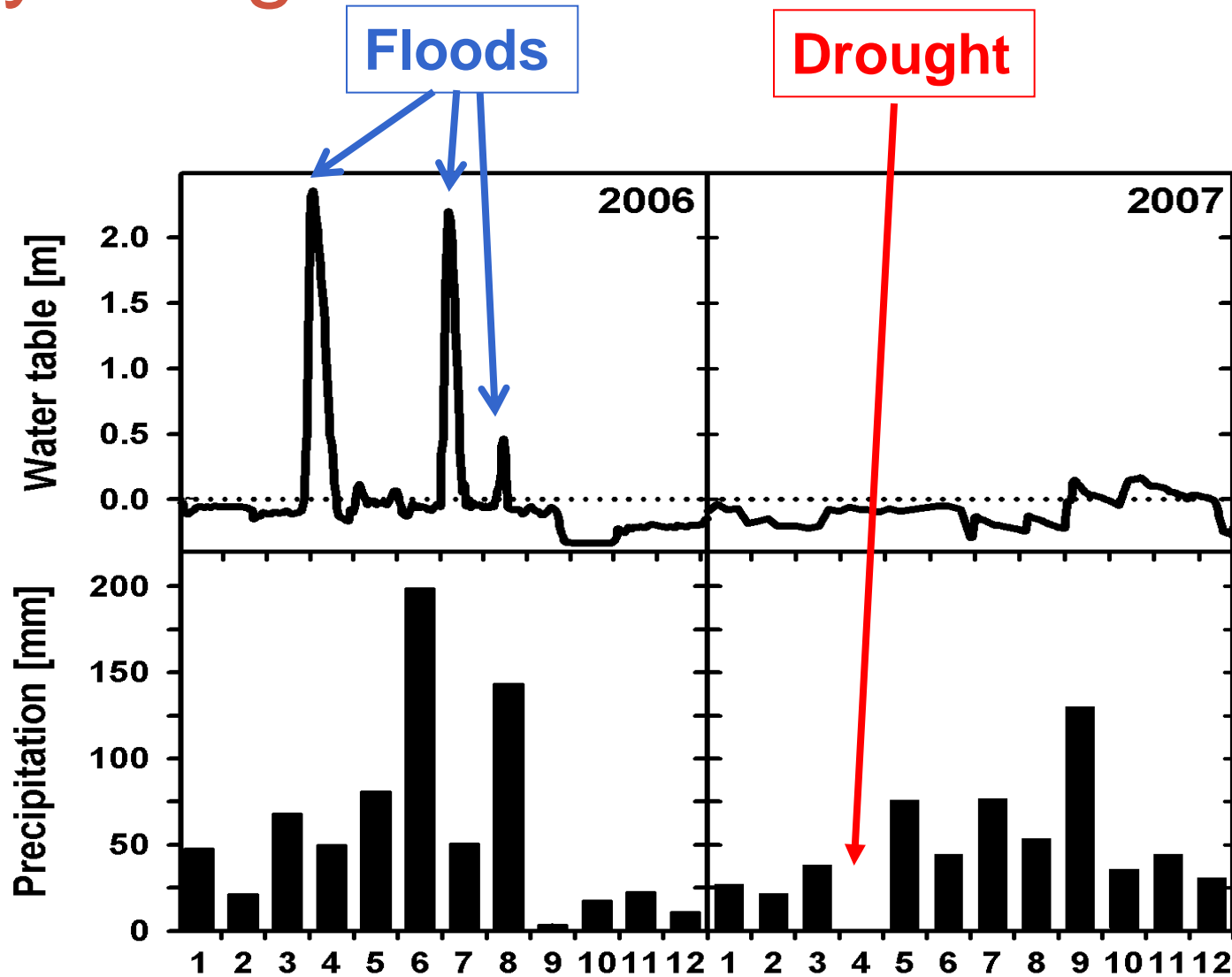
6x without plants

Data collection

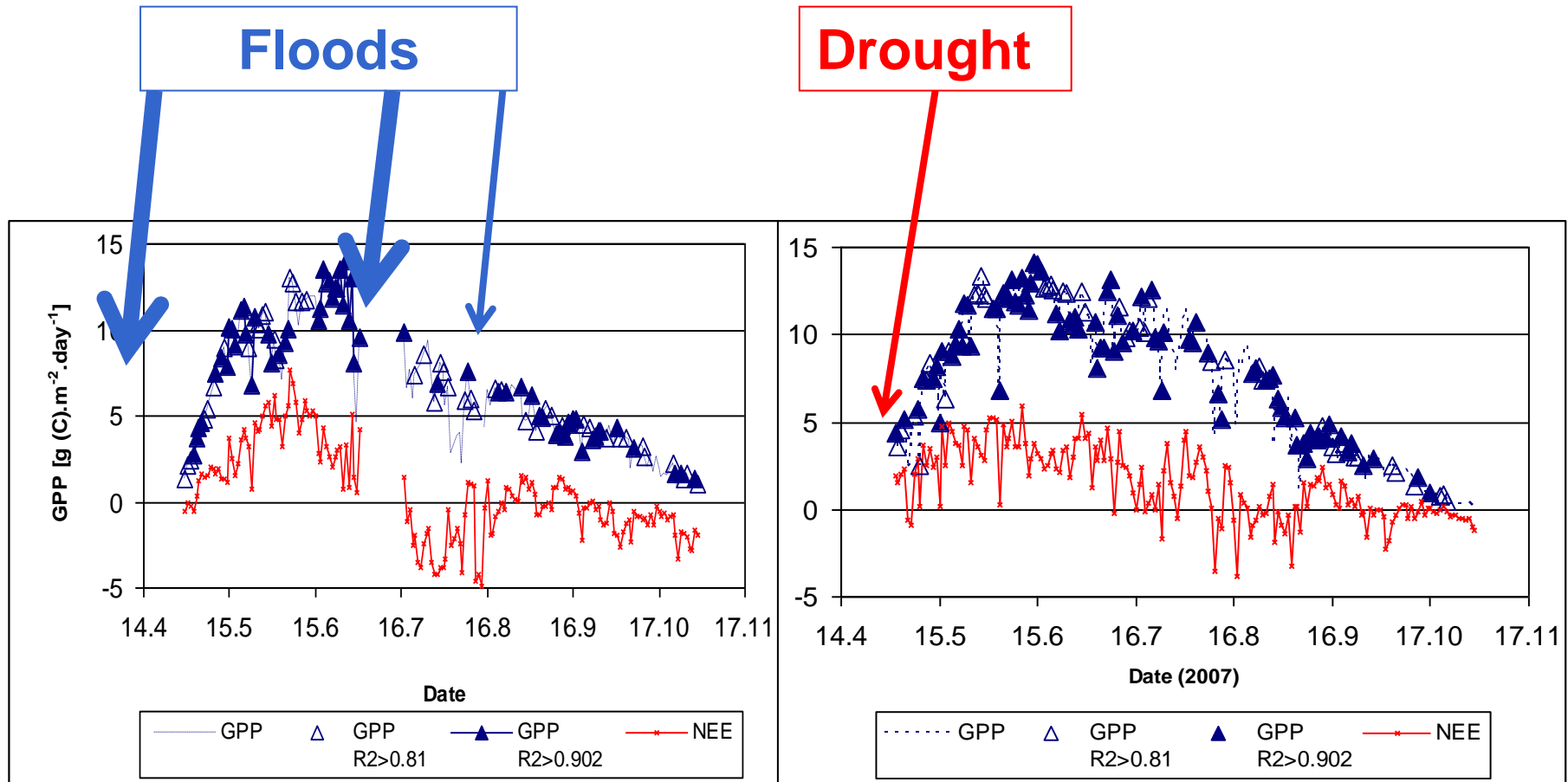
Aboveground biomass:
harvest method



Hydrological conditions

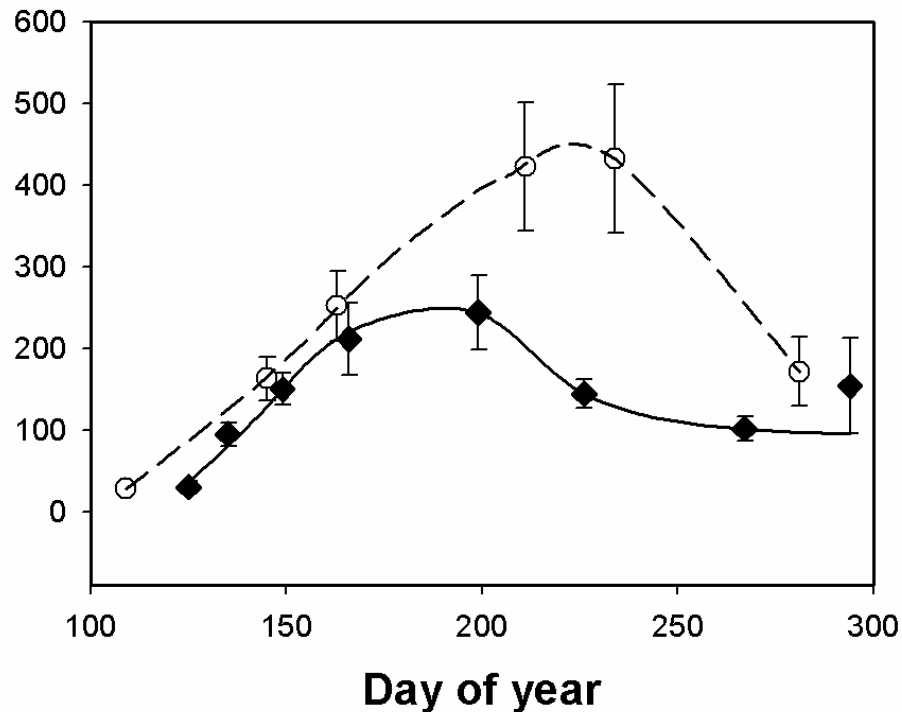


Seasonal course of GPP, NEP

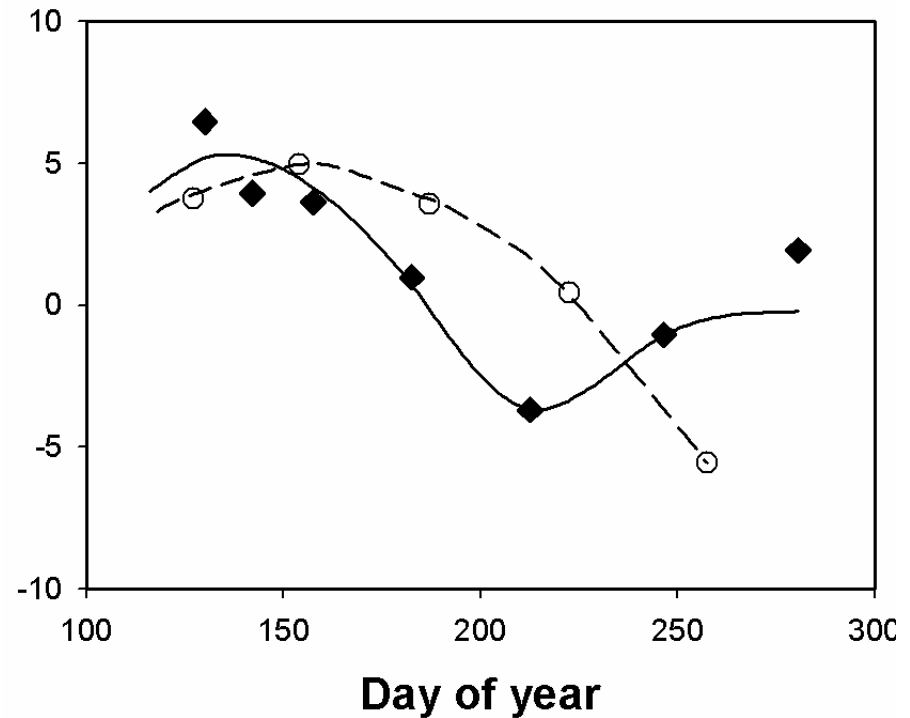


Seasonal course of live biomass

Live aboveground biomass (g.m⁻²)



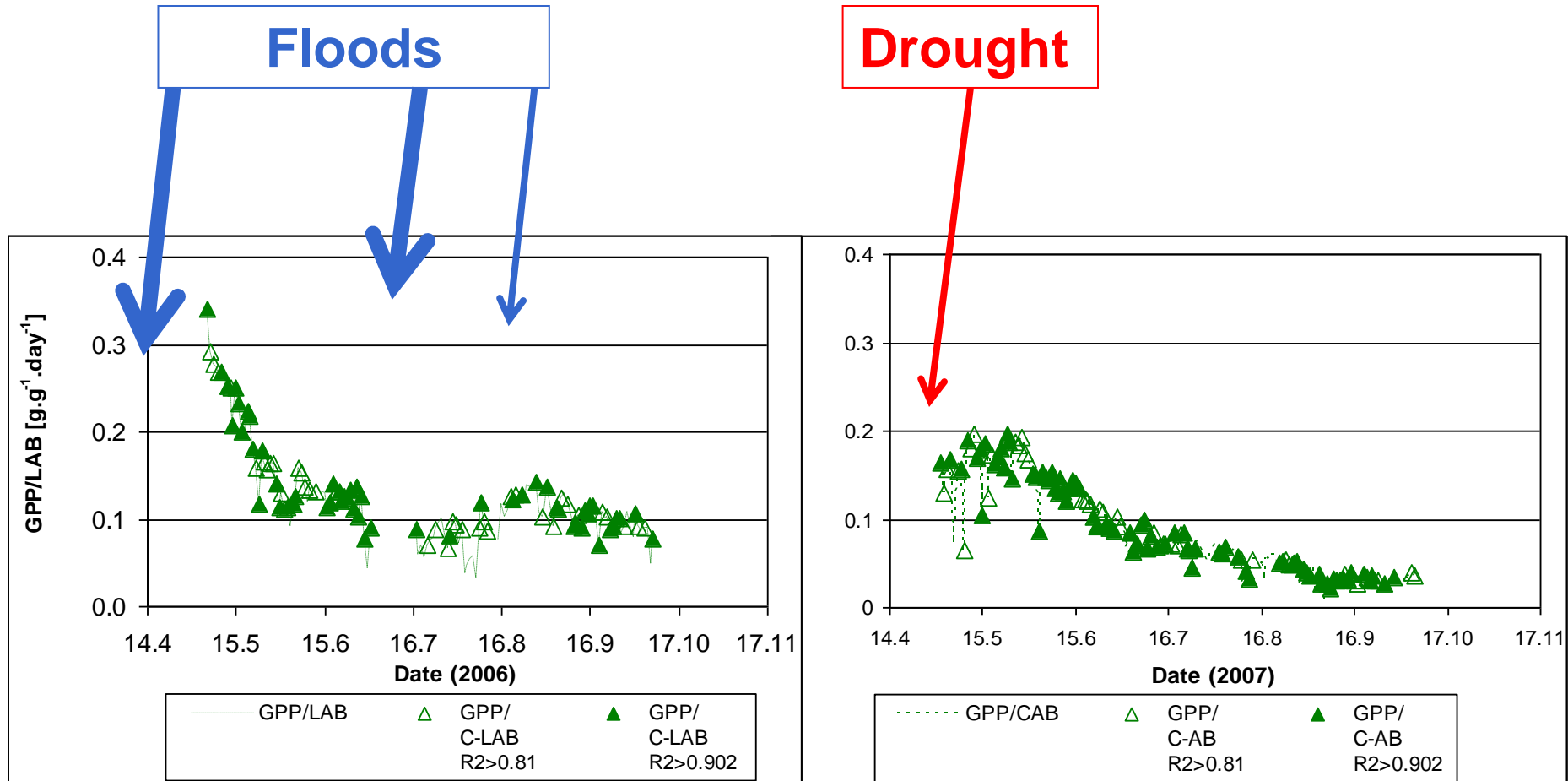
Crop growth rate (g.m⁻².d⁻¹)



—◆— 2006

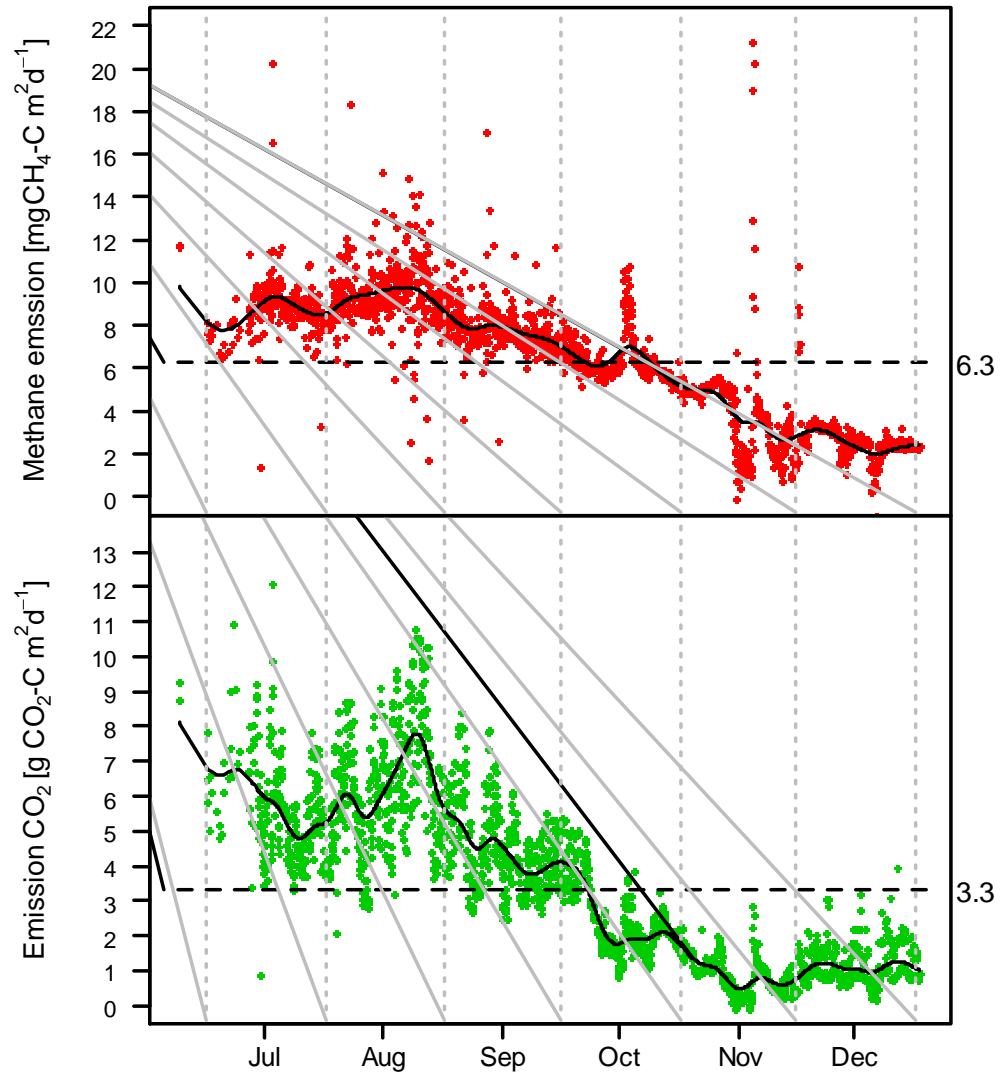
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C fixed per C in live biomass



CO₂ and CH₄ emissions

Continuous measurement



CO₂ and CH₄ emissions

Preliminary results of comparative measurement on vegetated and unvegetated areas



Date	CO ₂ flux (g CO ₂ -C.m ⁻² .d ⁻¹)		CH ₄ flux (mg CH ₄ -C. m ⁻² .d ⁻¹)			
	With plants	Without plants	With plants		Without plants	
	Mean ± SD	Mean ± SD	Mean	MAX	Mean	MAX
7.6	24.32 ± 4.40	4.44 ± 1.88	101.94	177.33	0.00	0.00
19.7	14.67 ± 1.61	4.77 ± 0.92	2.12	9.56	0.85	4.25
7.9	4.32 ± 1.12	0.55 ± 0.32	6.90	15.93	9.20	19.11

Conclusions

1. Differences in seasonal course of C fixation between years
2. Clear seasonal course of C fixation per unit of live aboveground biomass
3. Small proportion of CH₄ in total C emission.

A close-up photograph of a field of tall grasses. The foreground is dominated by several long, slender green blades of grass, some of which are topped with brown, fuzzy seed heads. The background is a dense thicket of similar grasses, some appearing more brown and dry than others. The overall scene is a natural, outdoor setting.

Thank you!