

# Biotic, Abiotic and Anthropogenic Controls on the Net Ecosystem CO<sub>2</sub> Exchange of European Mountain Grassland Ecosystems

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\* EU FP5 EVK2-CT2001-00125

## Outline

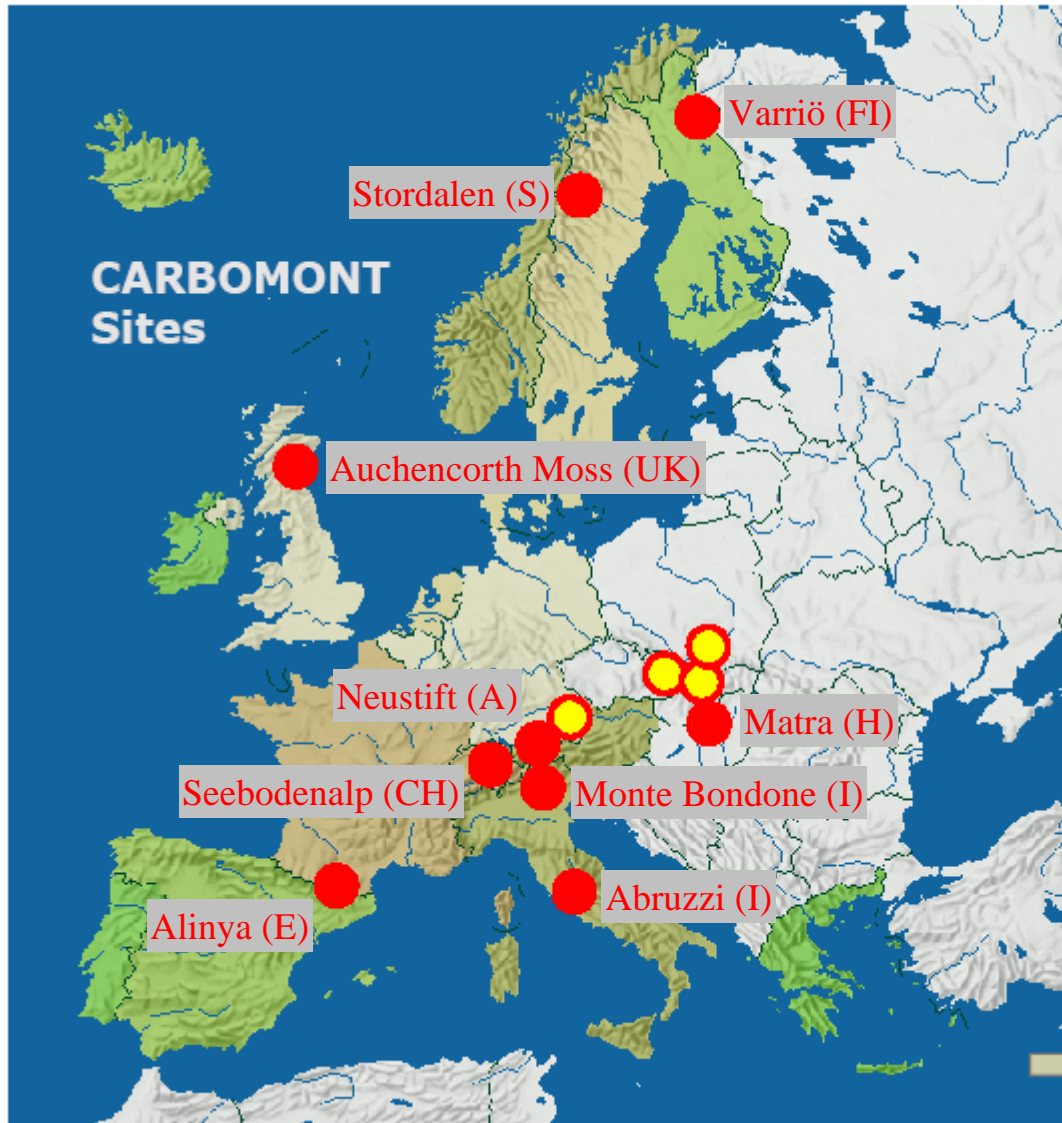
- CarboMont project: Objectives, study sites, methods
- Results
- Conclusion

# CarboMont

(EU FP5 EVK2-CT2001-00125)

- „Effects of land-use changes on sources, sinks and fluxes of carbon in European mountain grassland areas“
- FP 5 project, 2001-2004
- 15 partners from 13 countries (EU-25 & CH)
- 1.95 M€EU-contribution
- Coordinated by University of Innsbruck/Austria

# Study sites

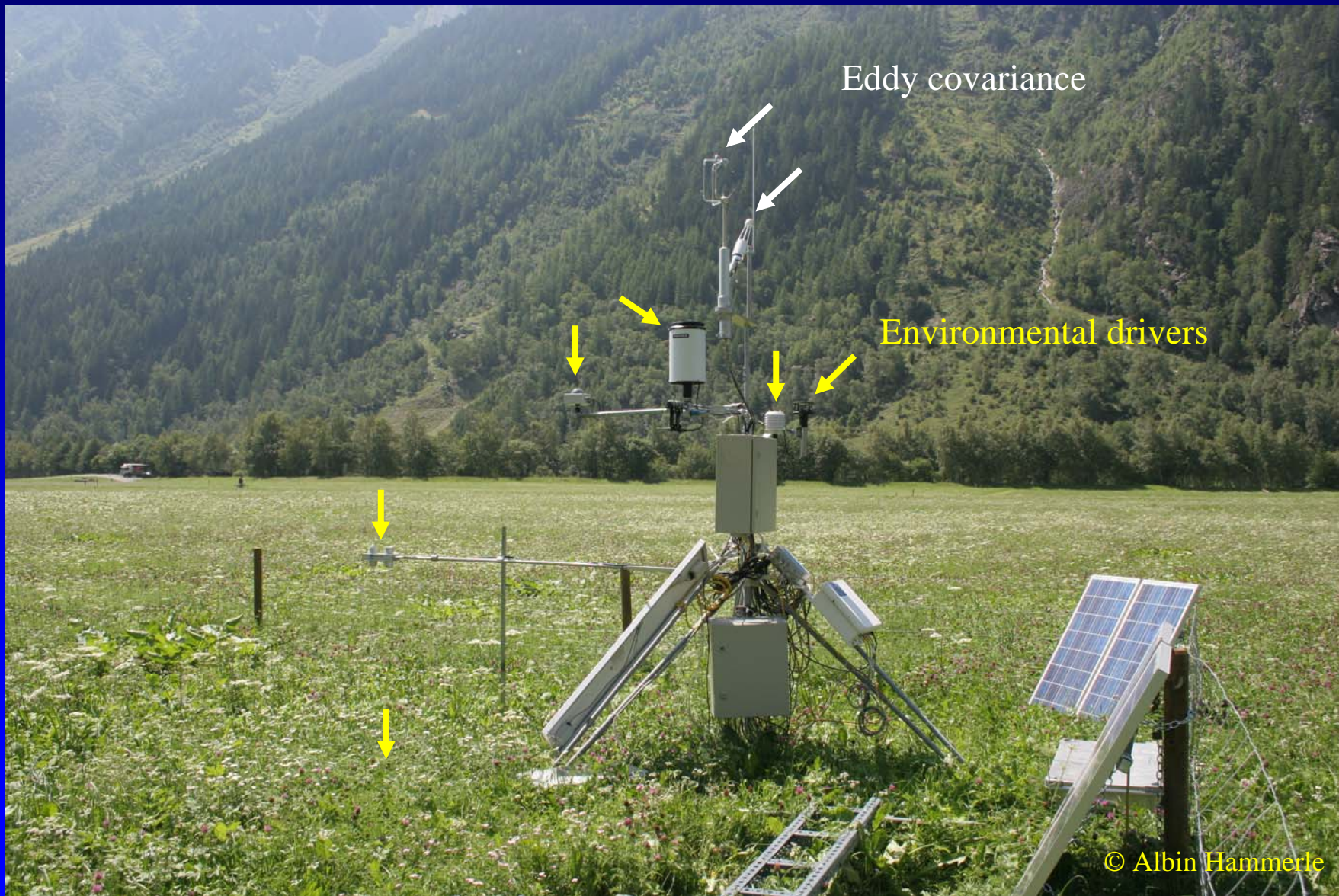


# Study sites

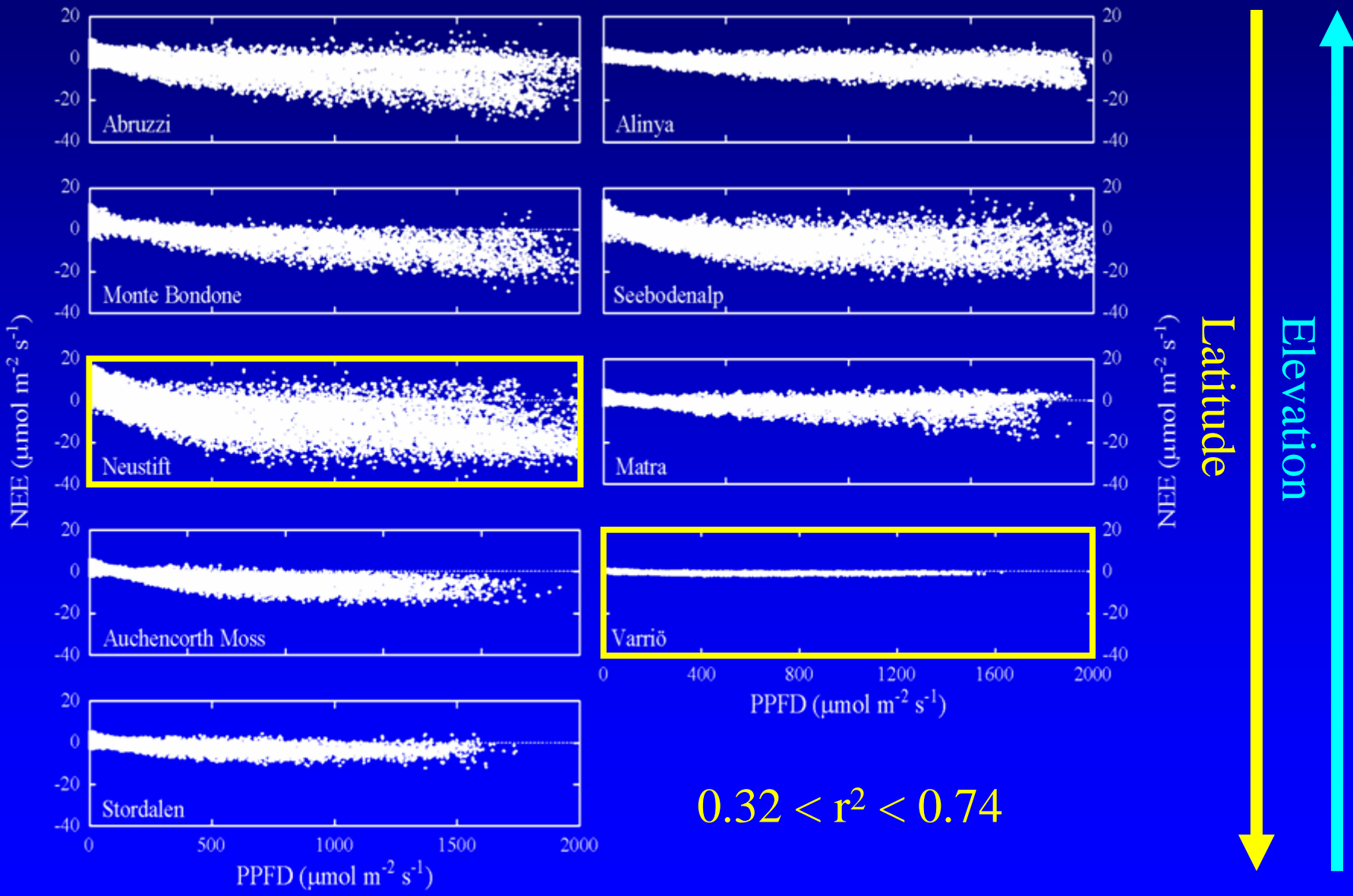
	Abruzzi (I)	Alinya (E)	Monte Bondone (I)	Seebodenalp (CH)	Neustift (A)	Matra (H)	Auchencorth Moss (UK)	Varriö (FI)	Stordalen (S)
Latitude/Longitude (decimal)	41.90/13.22	42.15/1.45	46.02/11.07	47.08/8.77	47.12/11.32	47.84/19.72	55.79/3.24	67.72/29.60	68.22/19.03
Elevation (m a.s.l.)	900	1770	1550	1025	970	300	270	480	360
Land use	cut (1x)	grazing	cut (1x)	cut (3x)	cut (3x)	cut (1x)	none	none	none
Fertilisation	manure	manure	-	manure	manure	manure	-	-	-
Eddy covariance:									
Data coverage	2002-2004	2002-2004	2002-2003	2002-2004	2002-2004	2003-2004	2002-2004	2002-2004	2002-2004
Measurement system	OP-1	OP-1	OP-1	OP-2	CP-1	OP-3	CP-2	OP-4	OP-1
Detrending algorithm	LD	BA	BA	BA	BA	LD	BA	LD	RM (200s)
Coordinate rotation	3D	2D	2D	3D	3D	3D	PF	3D	3D
Sensor separation (m)	0.2	0.3	0.3	0.3	0.1	0.3	0.05	0.1	0.1
Day/Night $u_*$ threshold ( $m s^{-1}$ )	-/0.15	0.10/0.10	-/-	-/-	-/0.10	-/-	-/-	-/0.25	0.05/0.05
Air/soil reference height (m)	4.0/-0.05	2.2/-0.1	3.0/-0.1	2.4/-0.05	3.0/-0.05	3.0/-0.05	3.6/-0.05	1.8/-0.05	2.7/-0.05



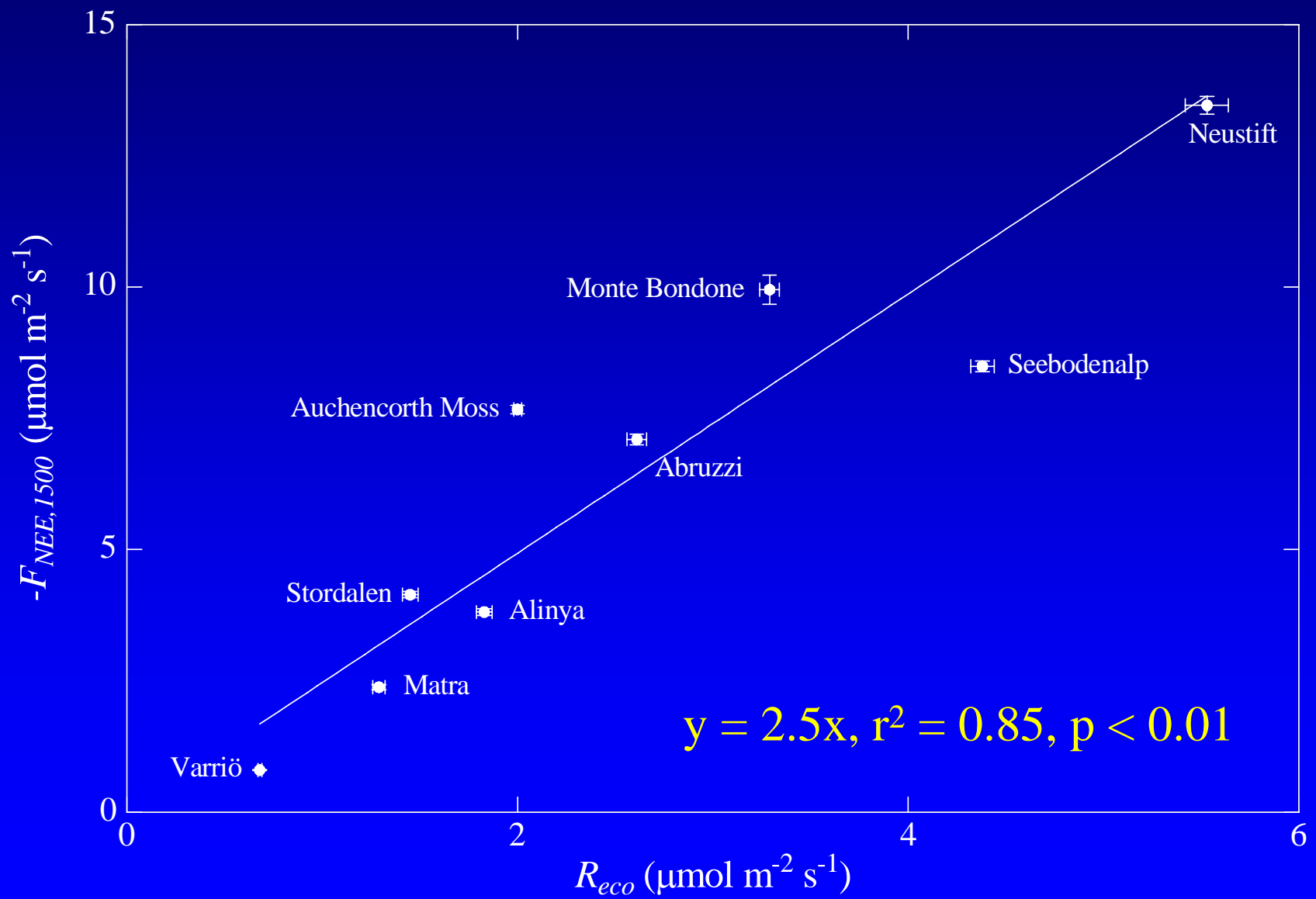
# Methods



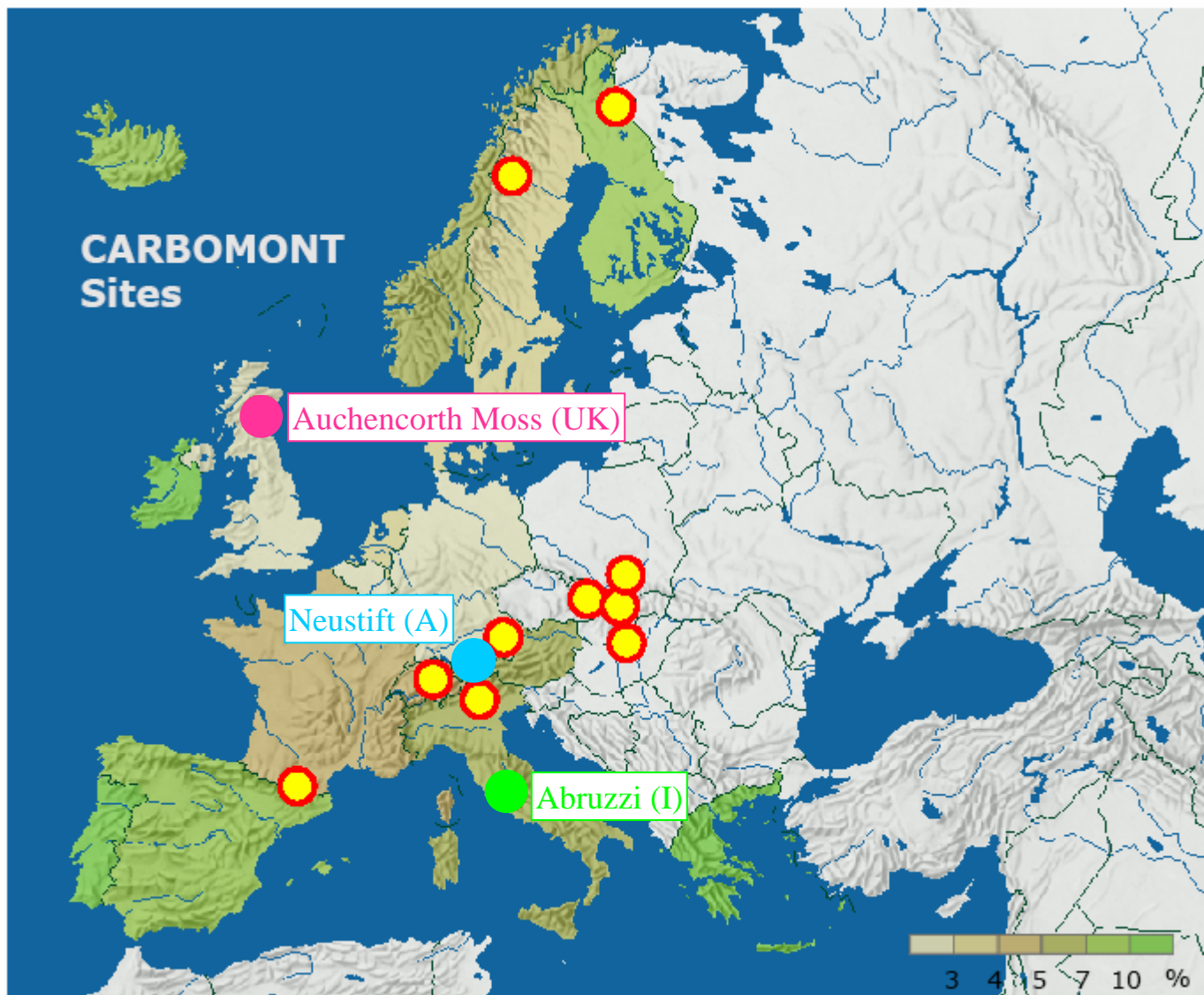
# Light response



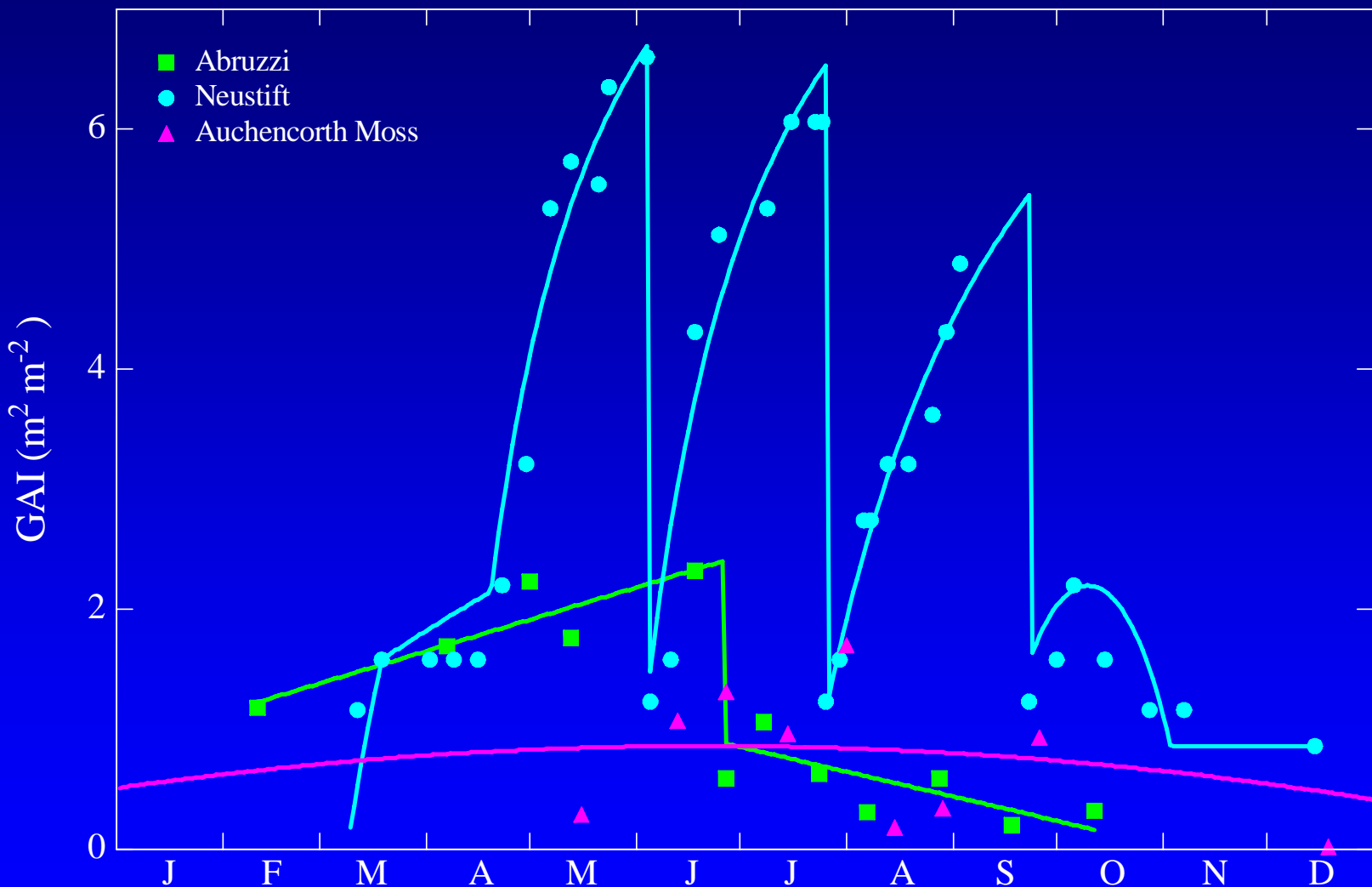
# Coordination of maximum uptake & loss of CO<sub>2</sub>



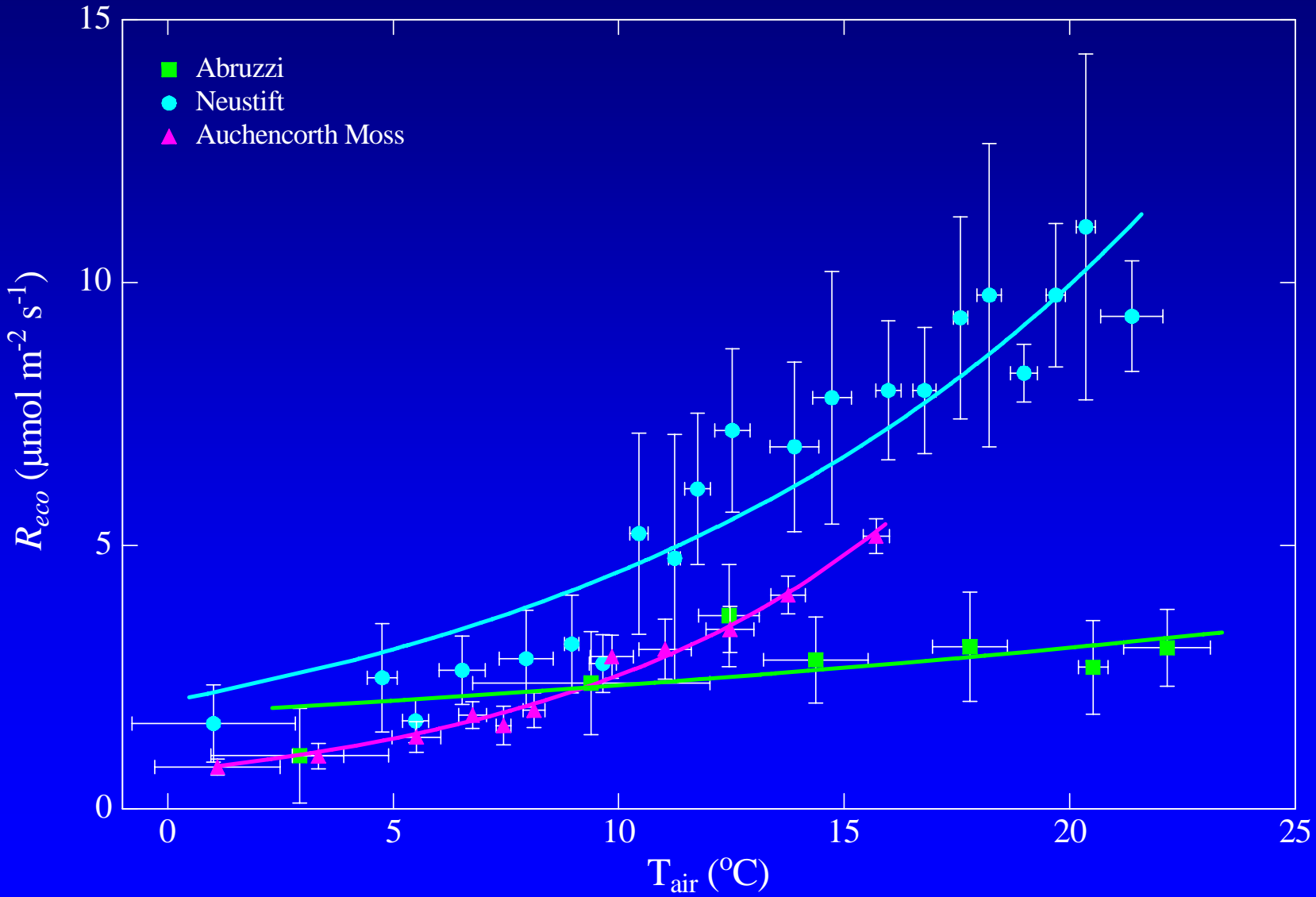
# Detailed study on controls on NEE



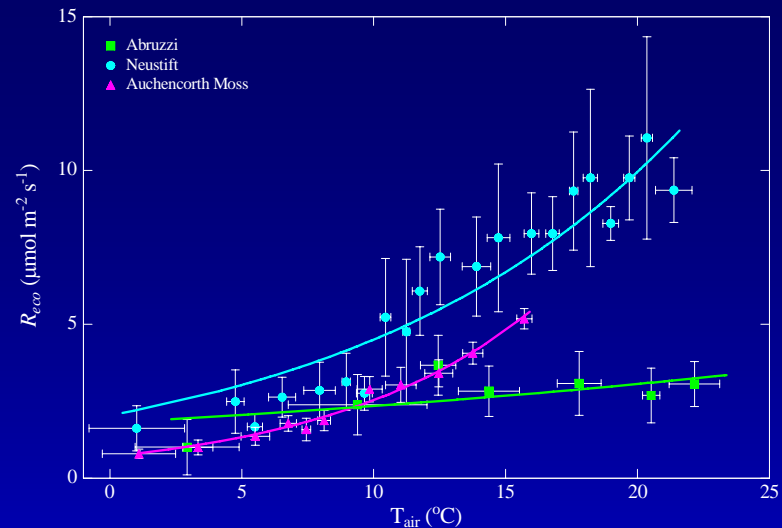
# Seasonal course of green area index (GAI)



# Ecosystem respiration



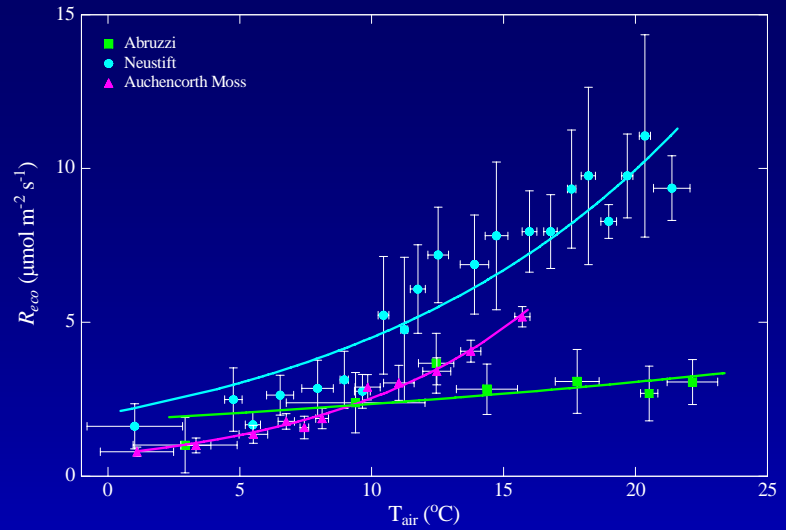
# Ecosystem respiration



Model 1  $R_{eco} = A \exp[BT_a]$

$r^2$	Abruzzi	Neustift	Auchencorth Moss
Model 1	0.19	0.72	0.92

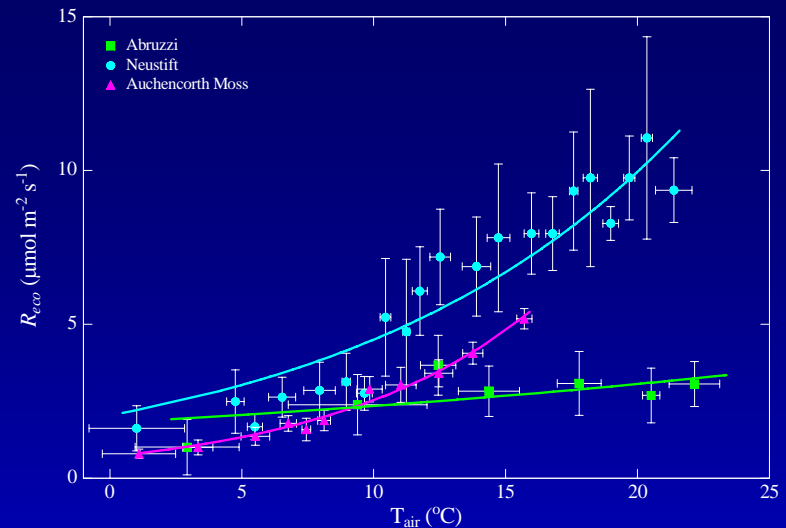
# Ecosystem respiration



Model 2 
$$R_{eco} = (BM_{ag} k_A + d_A) \exp[BT_a]$$

r <sup>2</sup>	Abruzzi	Neustift	Auchencorth Moss
Model 1	0.19	0.72	0.92
Model 2	0.51	0.81	0.92

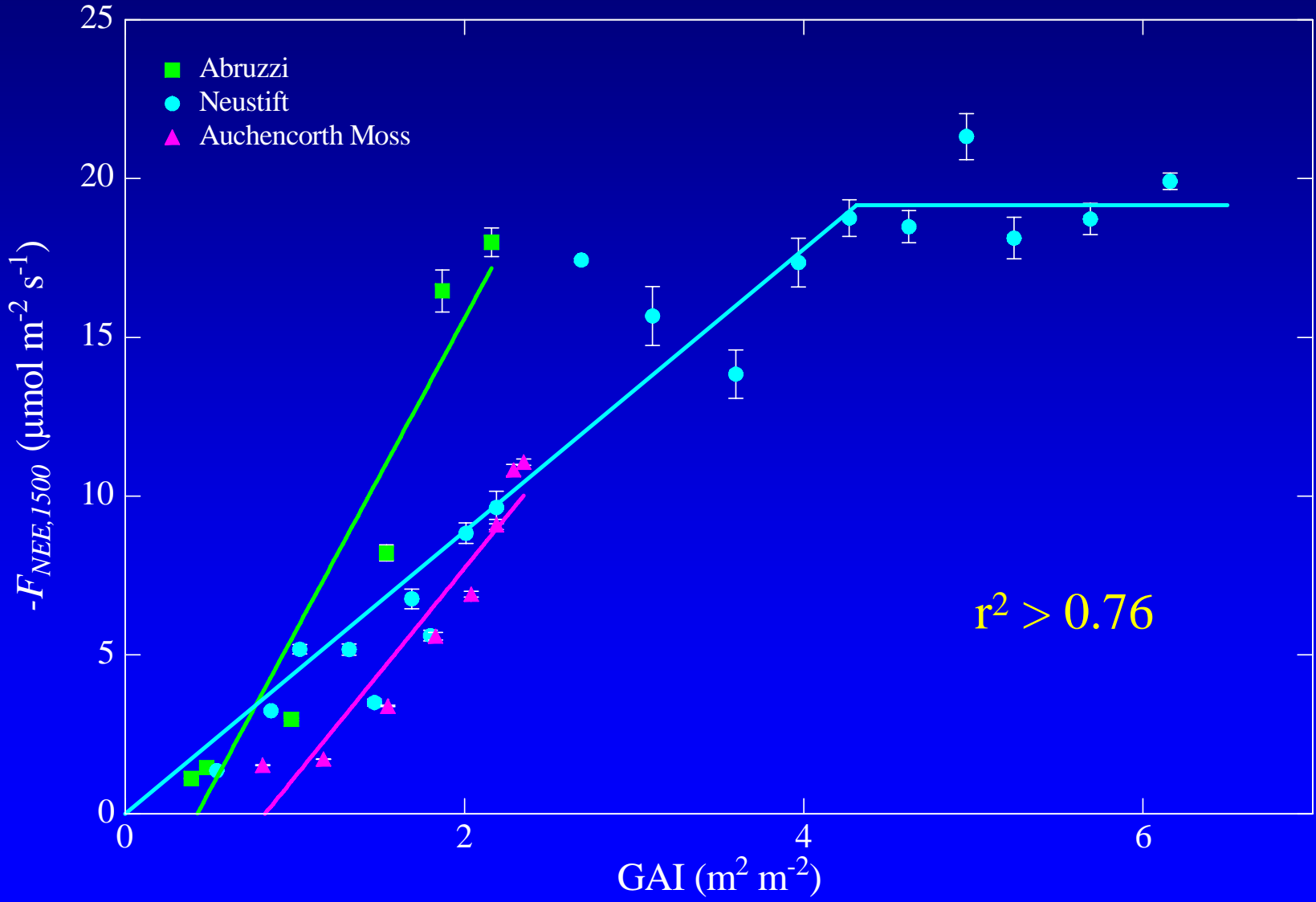
# Ecosystem respiration



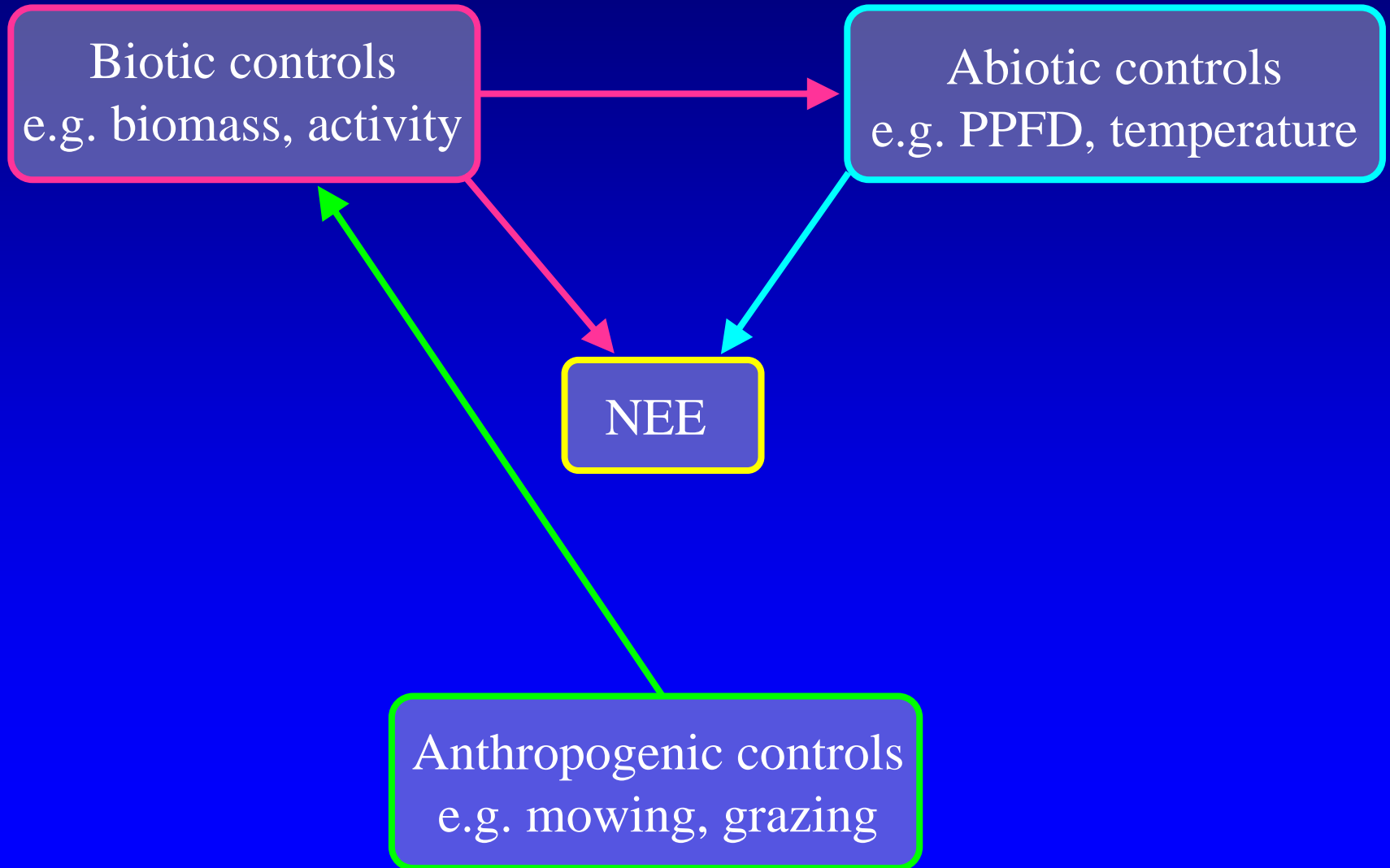
Model 3 
$$R_{eco} = (k_A BM_{ag} + d_A) \exp[(k_B RSWC + d_B) T_a]$$

$r^2$	Abruzzi	Neustift	Auchencorth Moss
Model 1	0.19	0.72	0.92
Model 2	0.51	0.81	0.92
Model 3	0.65	0.82	0.92

# CO<sub>2</sub> uptake potential



# Conclusion



A serene winter scene at dusk. In the foreground, a wooden fence with wire mesh is heavily laden with snow. Behind the fence, a small village is visible, with several buildings illuminated by warm lights. A prominent church with a tall spire stands out among the houses. The background is dominated by large, rugged mountains covered in snow, their peaks silhouetted against a twilight sky with scattered clouds. The overall atmosphere is quiet and peaceful.

**End**