



Relating self-regulation with ecosystem structure and function in northern peatlands

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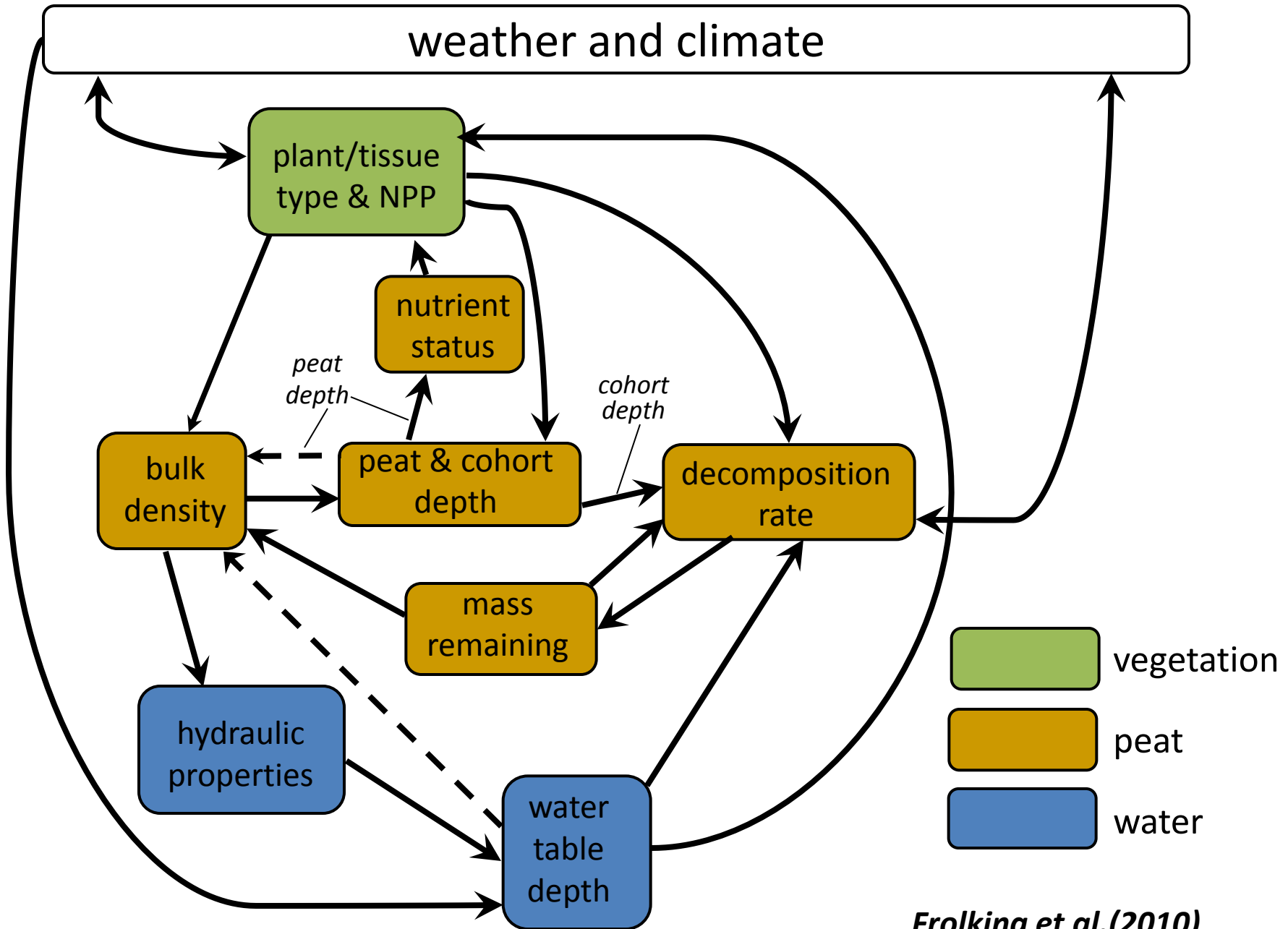
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Peatlands

- Net Primary Production >> Decomposition
- 2-3% of total land surface; store 25-30% of the world's soil carbon
- Carbon patterns and drivers related to **internal feedbacks** and **external factors**



Feedbacks linking peat properties, accumulation, water, vegetation, climate



Peatlands

- Carbon patterns and drivers related to internal feedbacks and external factors
- Peatlands are considered to be self-regulated systems
- Important to understand self-regulation, given climate change scenarios



Core of research proposal

Structure

- 1) Vegetation
- 2) Microtopography
- 3) Water table

Function

- 1) Net Ecosystem Exchange
- 2) Decomposition

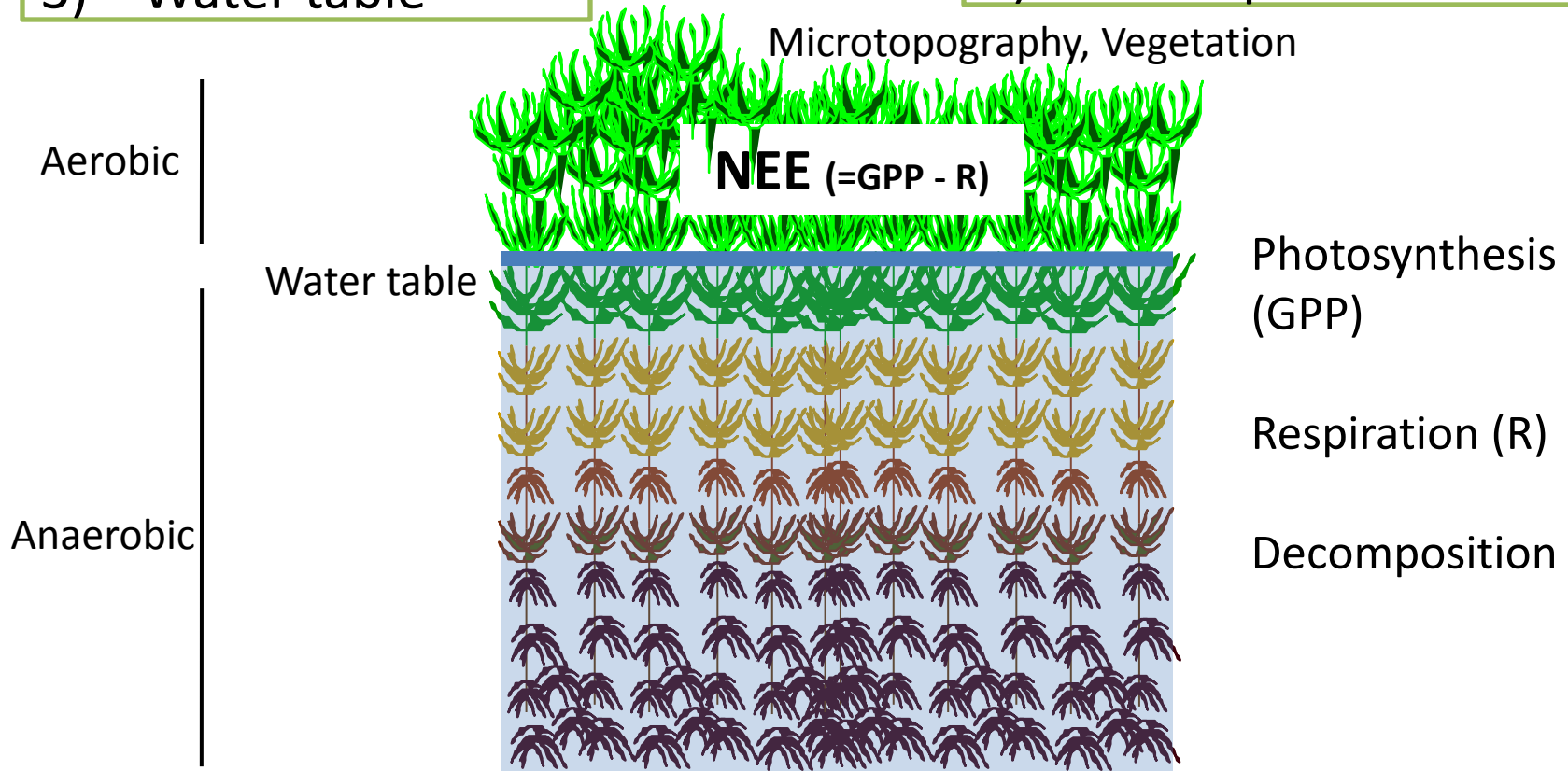


Figure modified from Dr. Melanie Vile

Study Sites

Stordalen Mire, Sweden

- Primary site
- Steep ecological gradients
- Variable degrees of self-regulation within site: permafrost, hydrology

Mer Bleue Bog, Canada

- Ombrotrophic bog without steep ecological gradients
- More self-regulated and homogeneous

Stordalen Mire

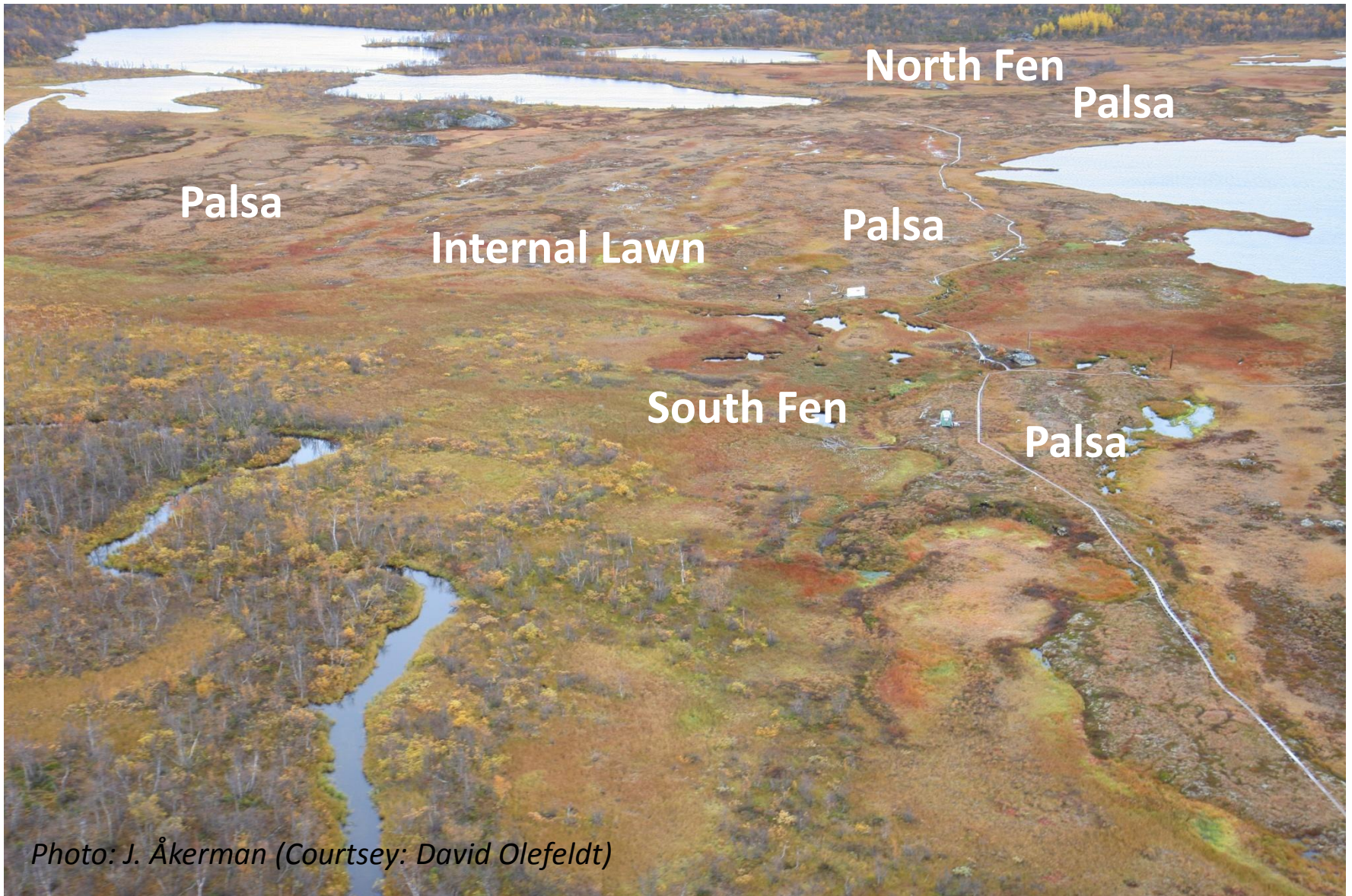


Photo: J. Åkerman (Courtesy: David Olefeldt)

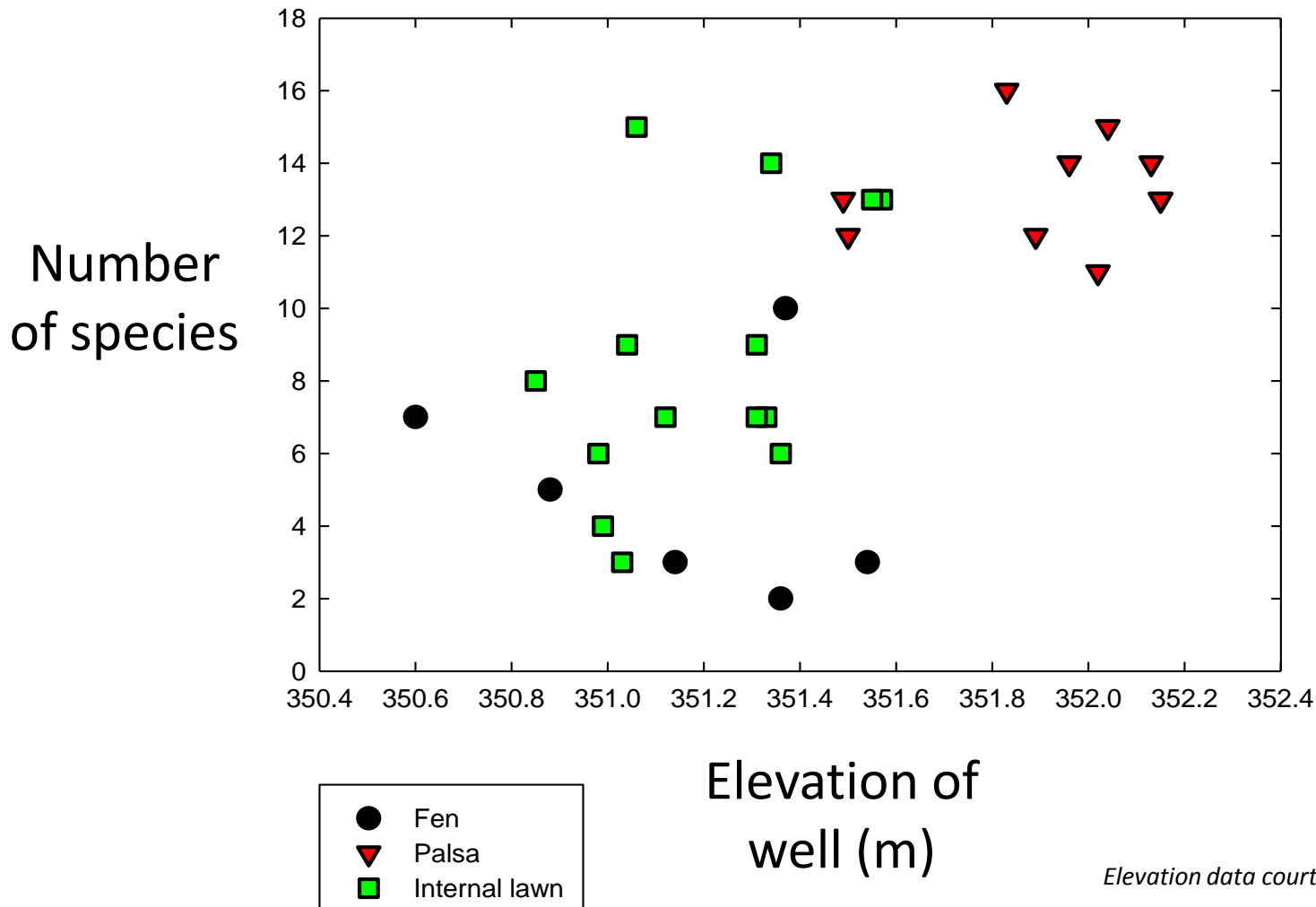
Preliminary Data: Relationship between Vegetation and Microtopography

- Point intercept method + Elevation data
- Stordalen and Mer Bleue (different spatial scales)

Vegetation and Microtopography

Elevation and # of species:

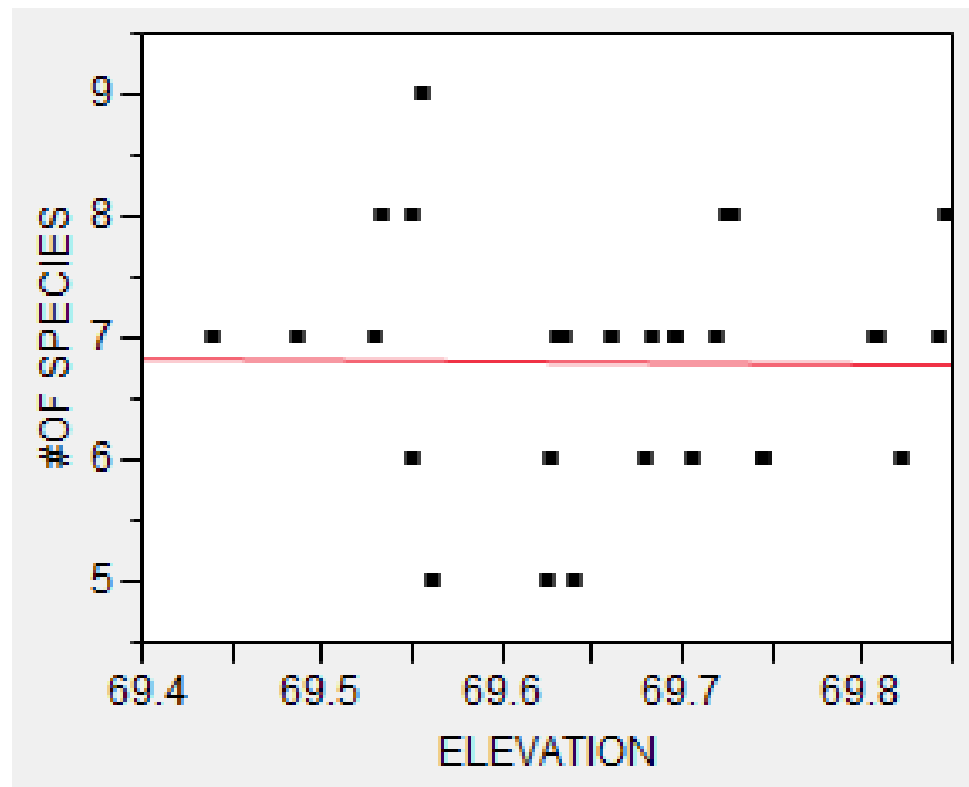
No longer significant!



Vegetation and Microtopography

Elevation and # of species:

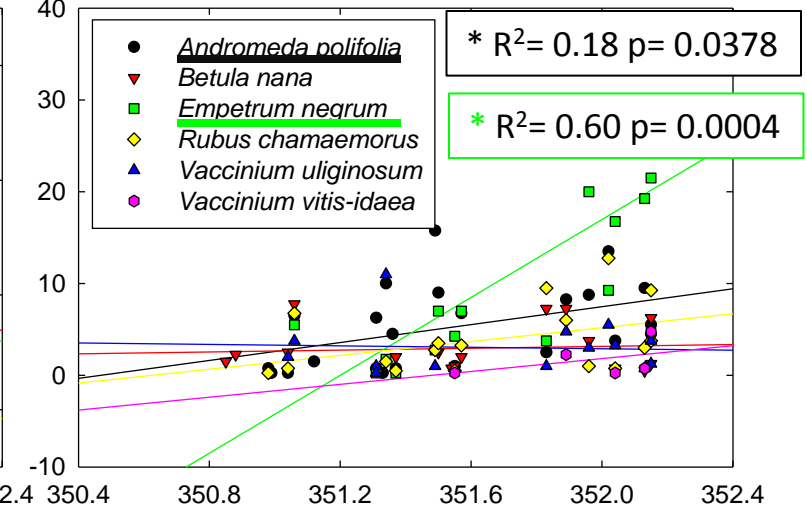
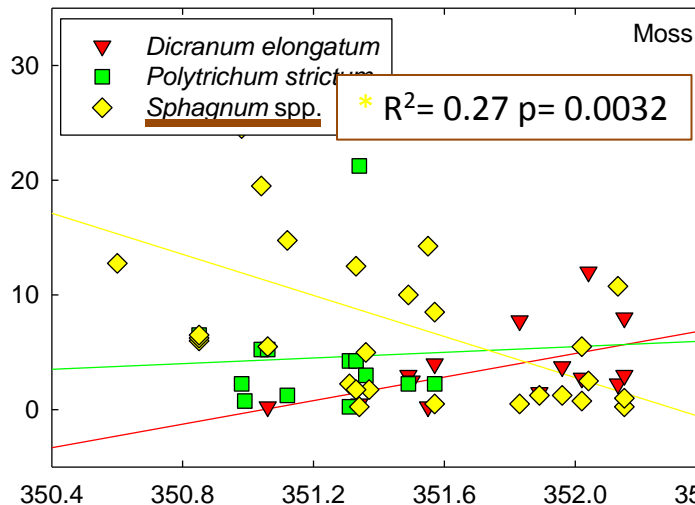
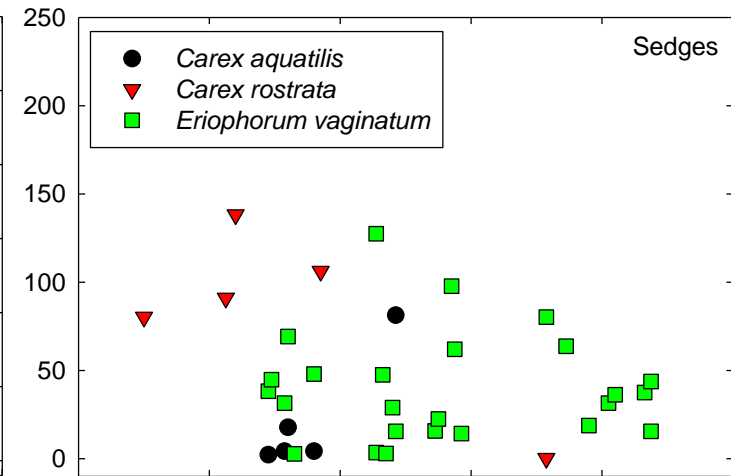
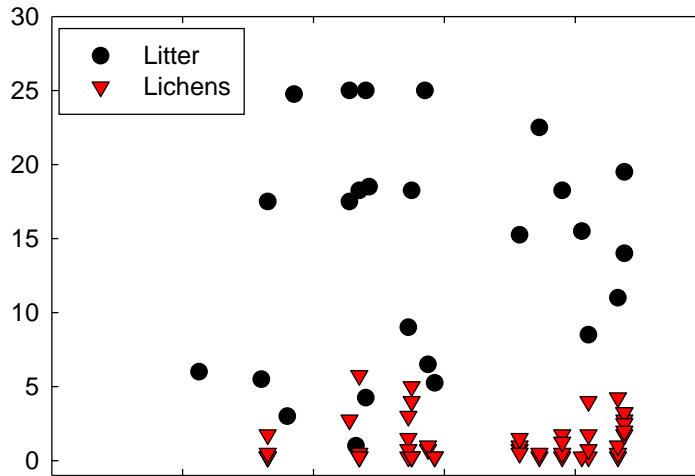
No significant relationships at Mer Bleue (sub-site level)



Stordalen veg. overview

(Site Level Scale)

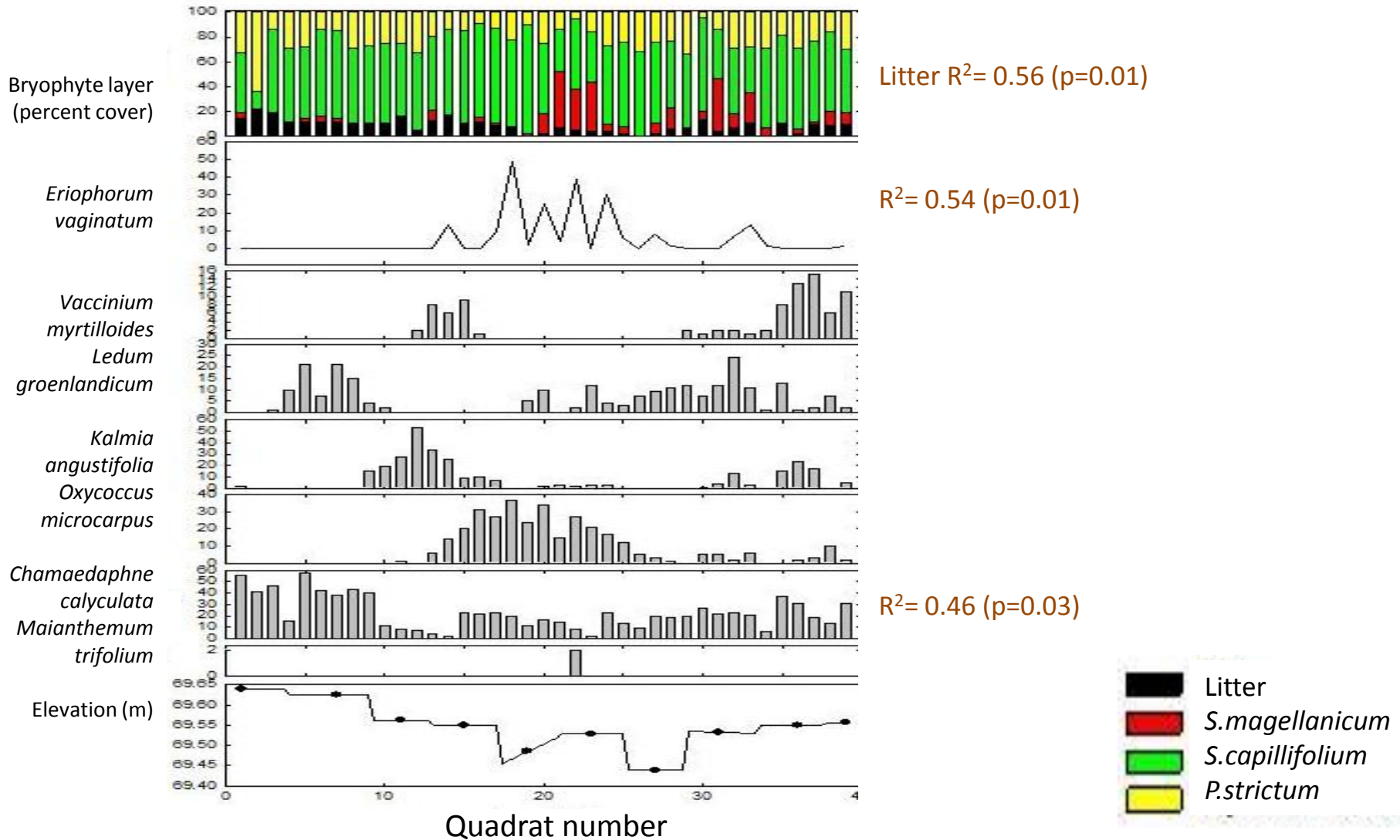
Number of hits per species per quadrat



Elevation (m)

Mer Bleue veg. overview: sample transect

(Sub-site Level Scale)



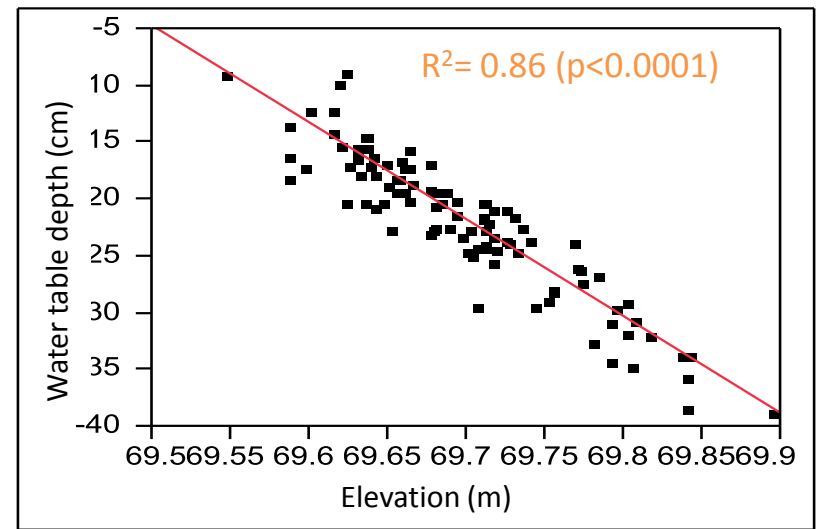
Preliminary Data Conclusions

1. Number of species better correlated to elevation at Stordalen at site level than at sub-site level and not at MB sub-site level.
2. More individual species abundance correlated to elevation at MB compared to Stordalen- but at MB spatial autocorrelation included as scale level is lower.

Preliminary Data Conclusions

Next steps:

- Relationship with water table
- Veg. community level questions
- Relating to functional processes





Broad Research Objective: Understand self regulation in peatlands by observing the relationship between structure and function across areas of different self regulation.

Structure

- 1) Vegetation
- 2) Microtopography
- 3) Water table



Function

- 1) Net Ecosystem Exchange
- 2) Decomposition

Expect to find that in a more self-regulated system:

- 1) Stronger structure-function relationship
- 2) More up-scalability
- 3) Less steep gradients

Thank you!

Acknowledgements

- Committee members for valuable feedback- Nigel Roulet, Tim Moore, Jill Bubier and Federic Guichard
- Paul Wilson and Dr. Andreas Persson for elevation and WT data
- Mike Dalva, Silvie Harder, Nadine Shatilla, Meaghan Murphy and Léa Braschi for help in the lab and field



Site Set-up: Sample S1-2Transect

