The impact of land use change and forest management on net ecosystem carbon budgets.

"The role of land cover and ecosystem management on carbon sequestration"

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Presentation Overview

- **CARBiFOR II key research questions?**

- **Methodology;**
  - *Eddy covariance techniques.*
  - *Static and mobile flux towers.*

- **Impacts of land use change, afforestation and forest age;**
  - *Sitka spruce chronosequence.*
  - *Ash chronosequence.*

- **Impacts of forest management;**
  - *How does forest thinning influence net ecosystem carbon fluxes?*

- **Summary**
  - *Role of land cover and forest management in mitigating climate change.*

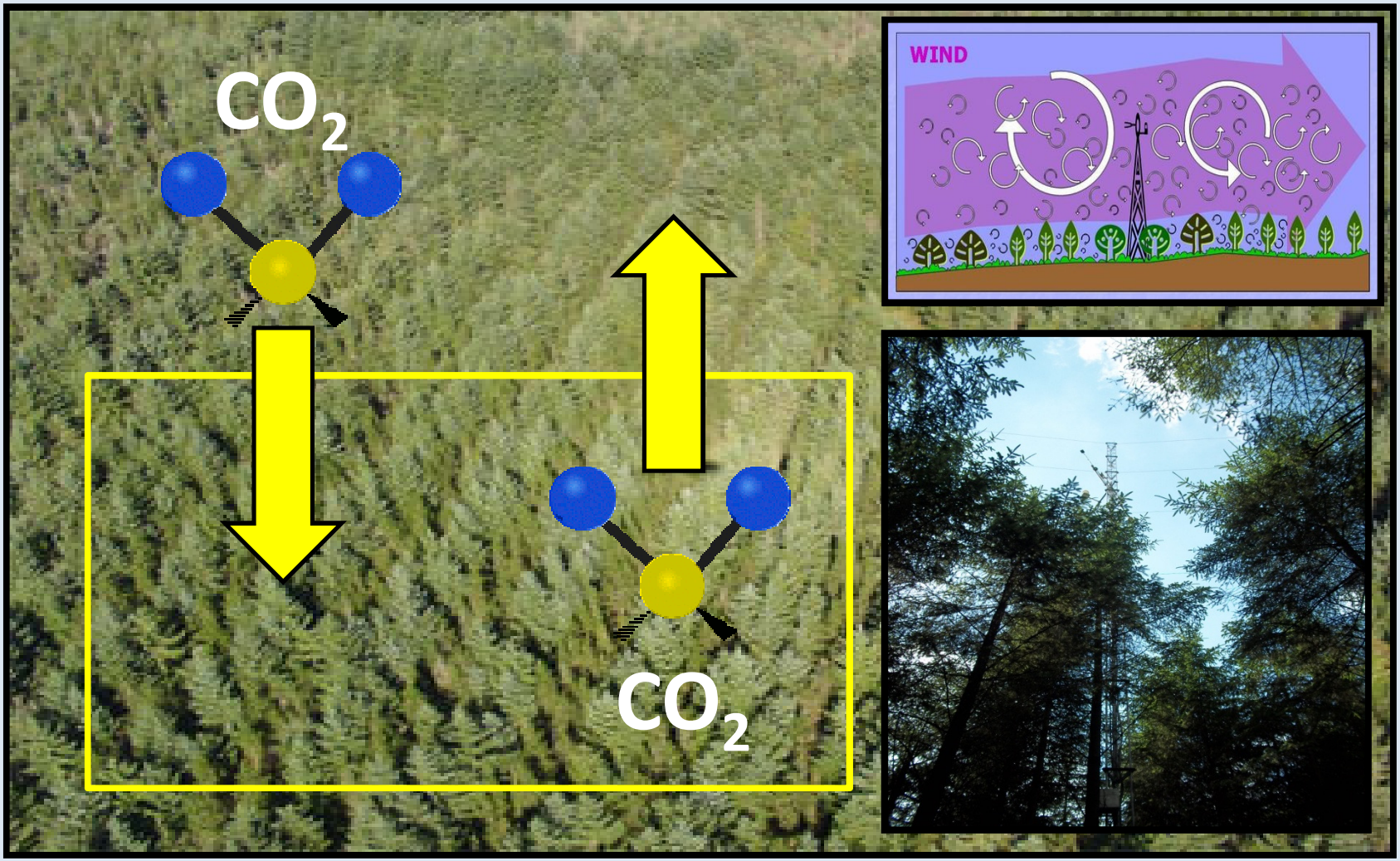
Key questions?

- What role can different forest ecosystems play in climate change mitigation through carbon assimilation and sequestration?

- What impact does afforestation, land use change and forest age have on the carbon budget of forest ecosystems?

- How do forest management practices such as thinning impact on net ecosystem carbon fluxes?

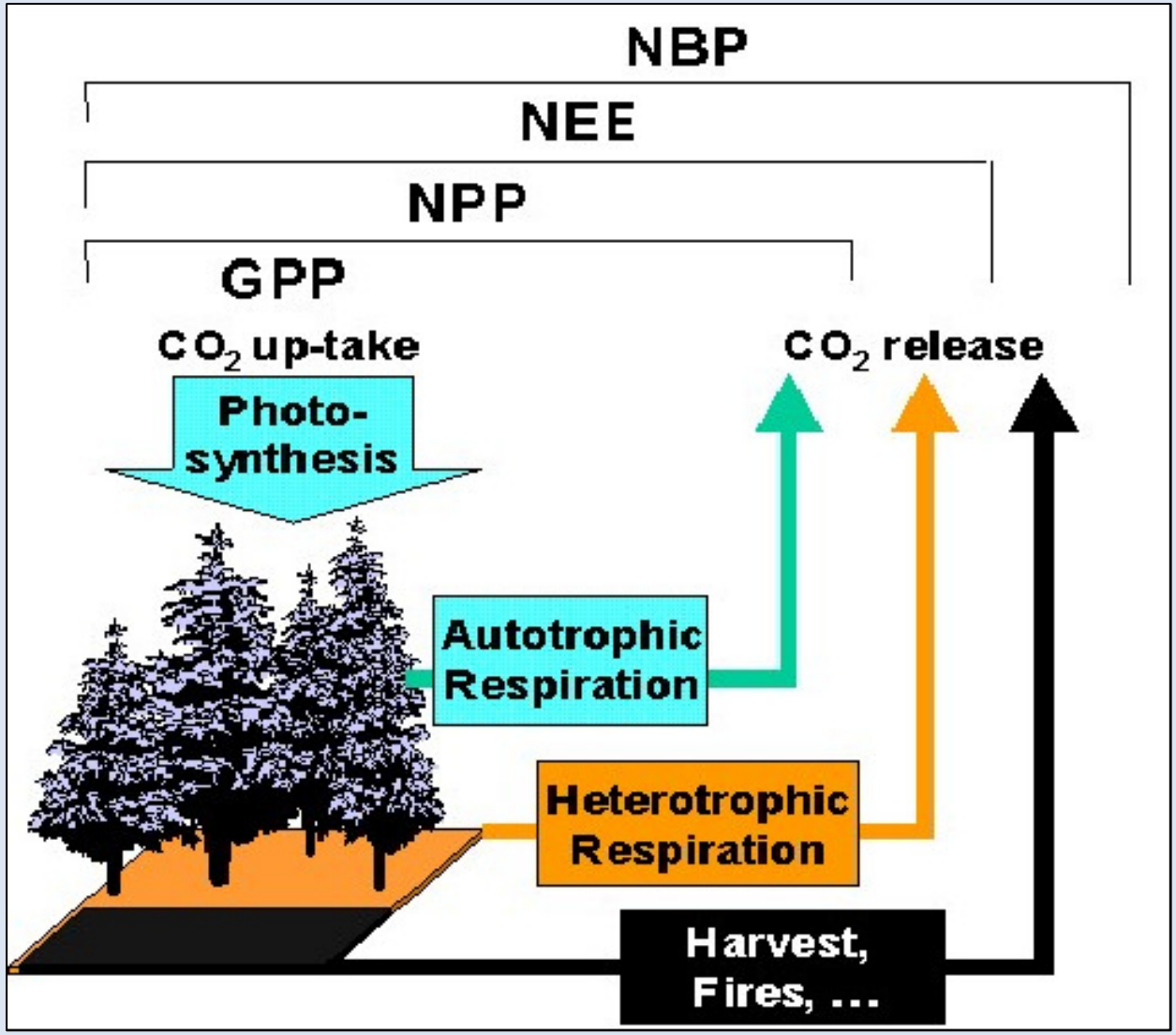
Methodology: Eddy covariance techniques.



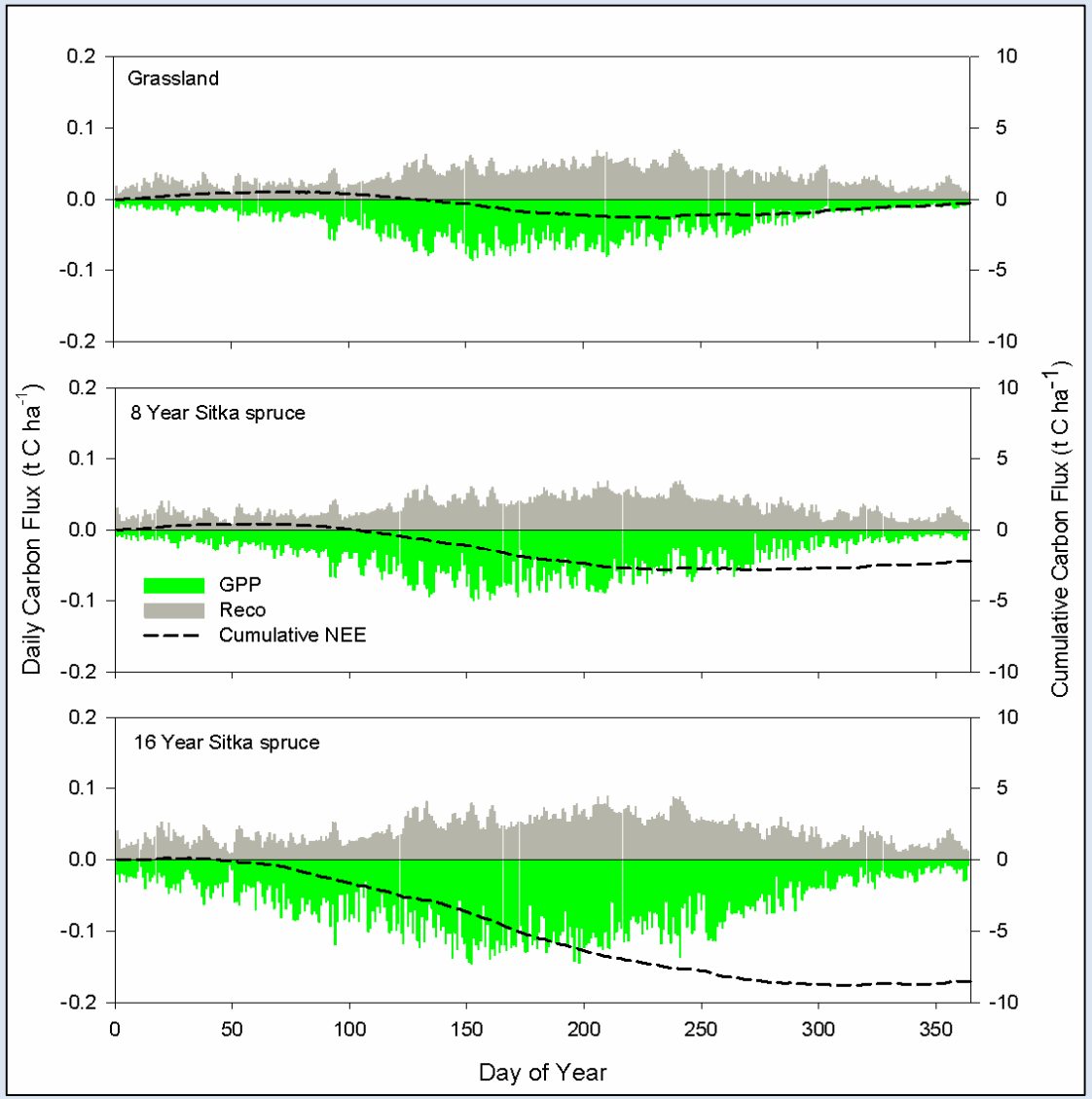
Methodology: Static flux tower.

Methodology: Mobile flux tower.

Methodology: Net Ecosystem Exchange (NEE)



Afforestation and carbon fluxes.



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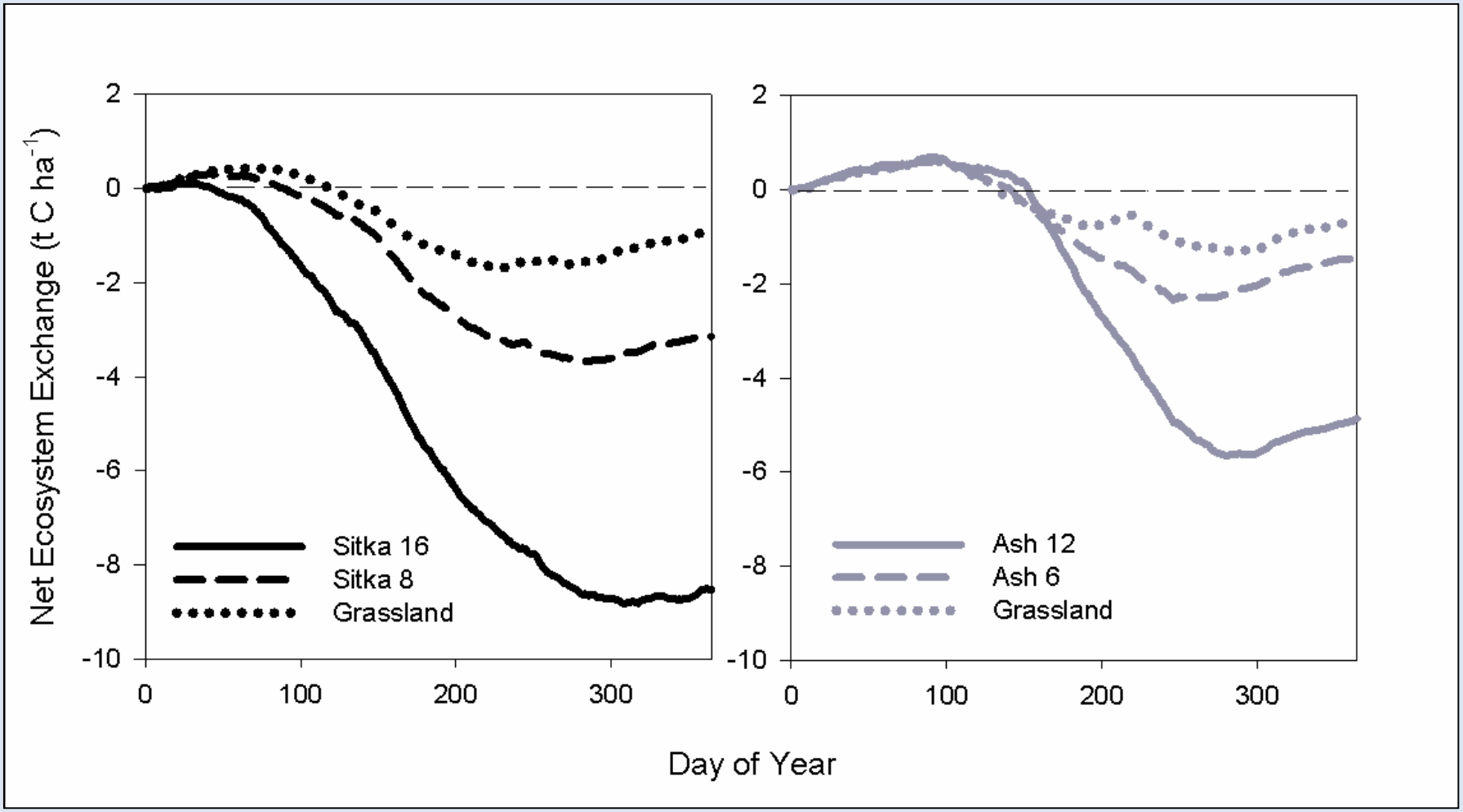
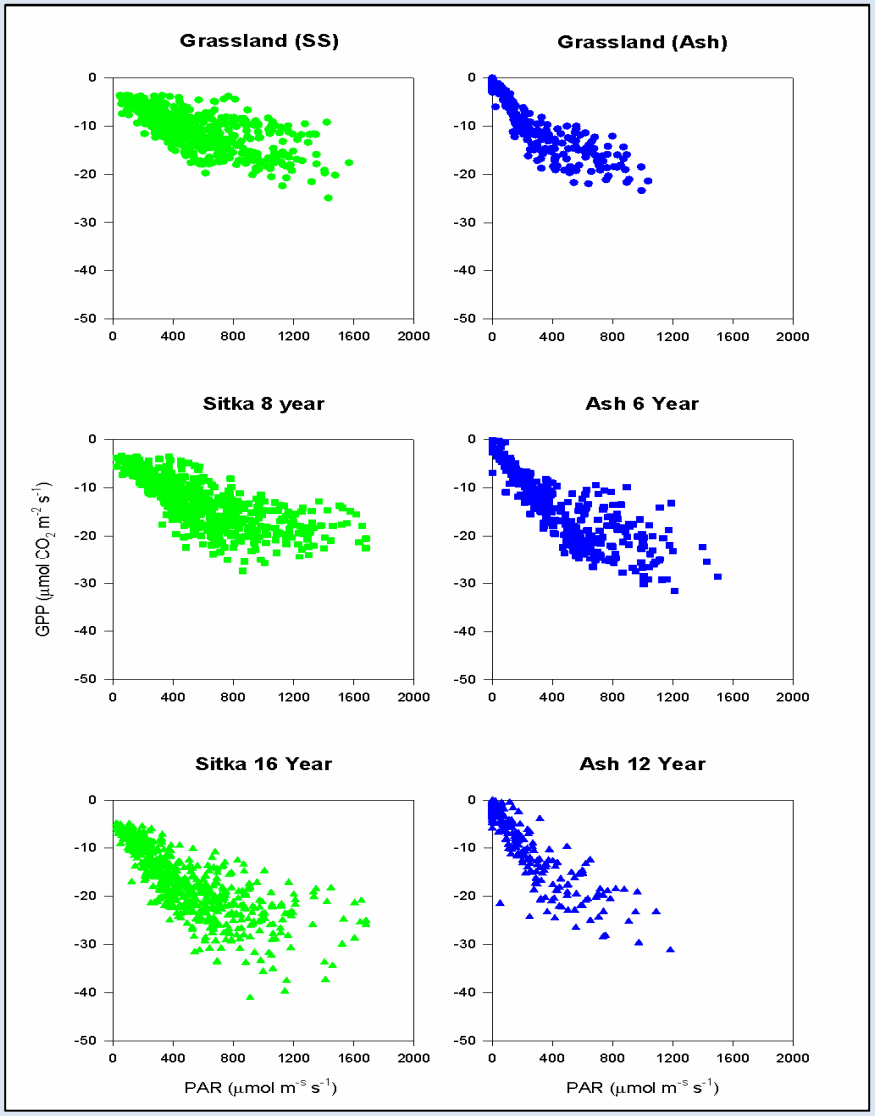
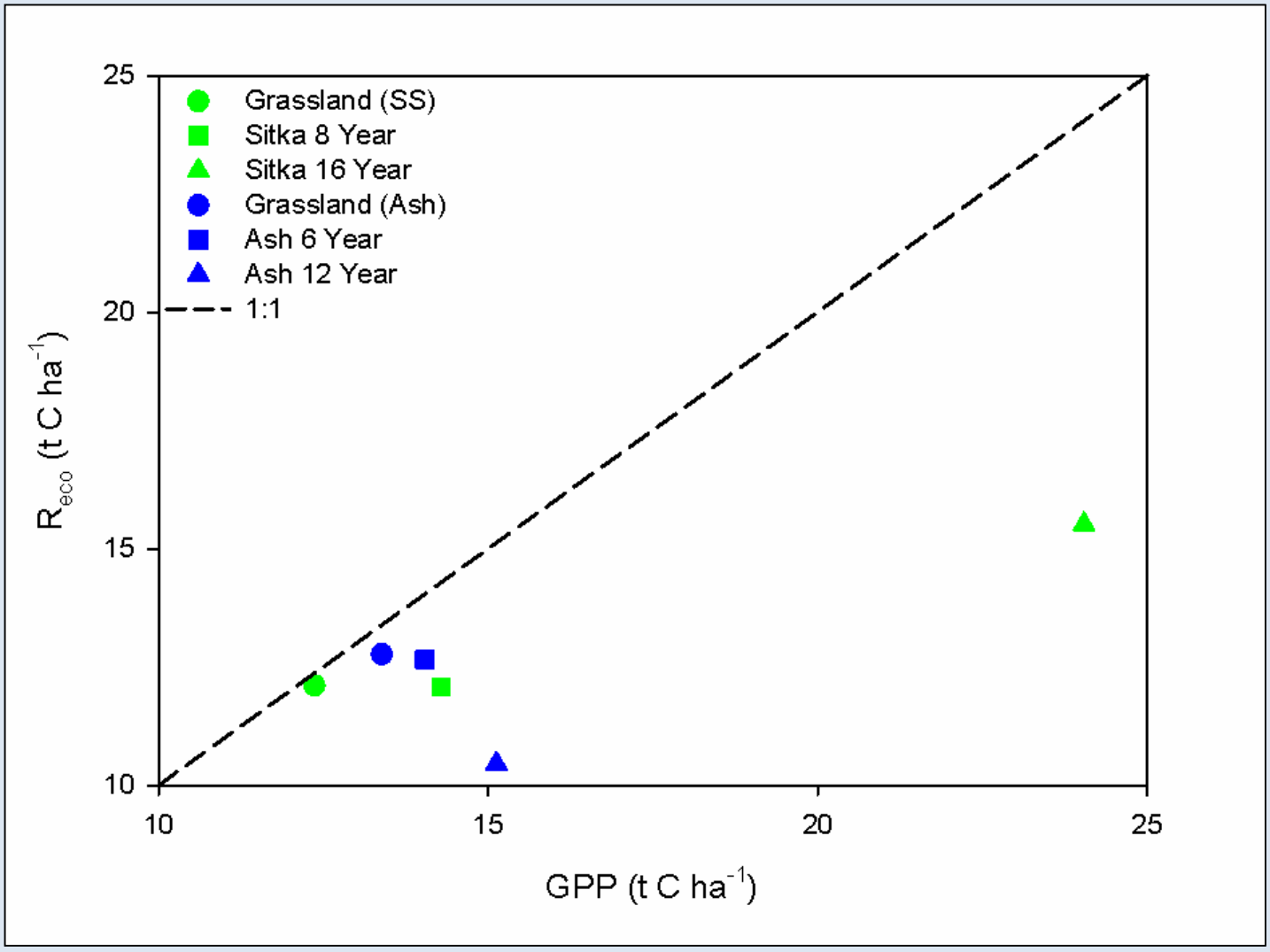


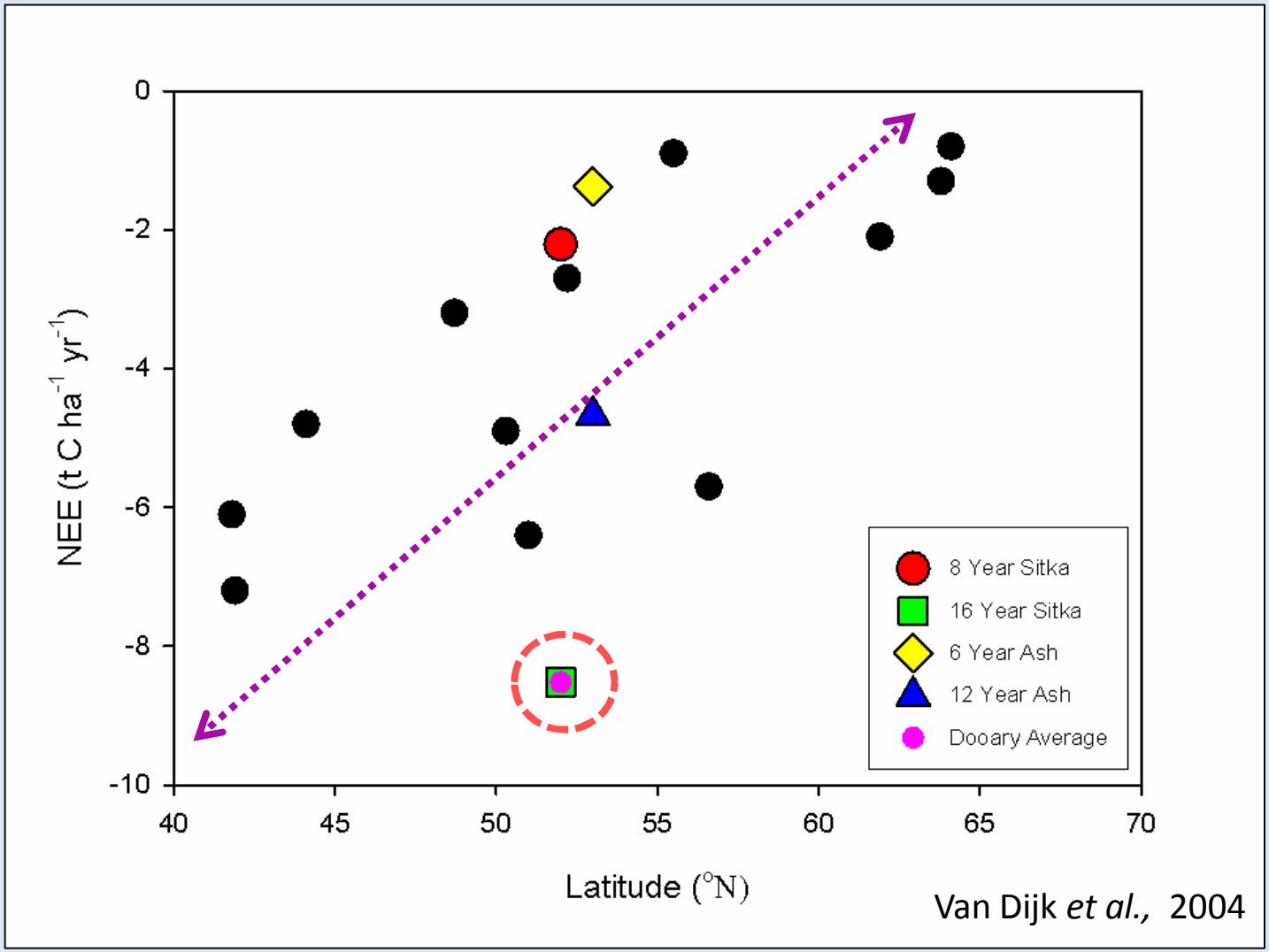
Chronosequence light response curves



Relationship between carbon budget components.



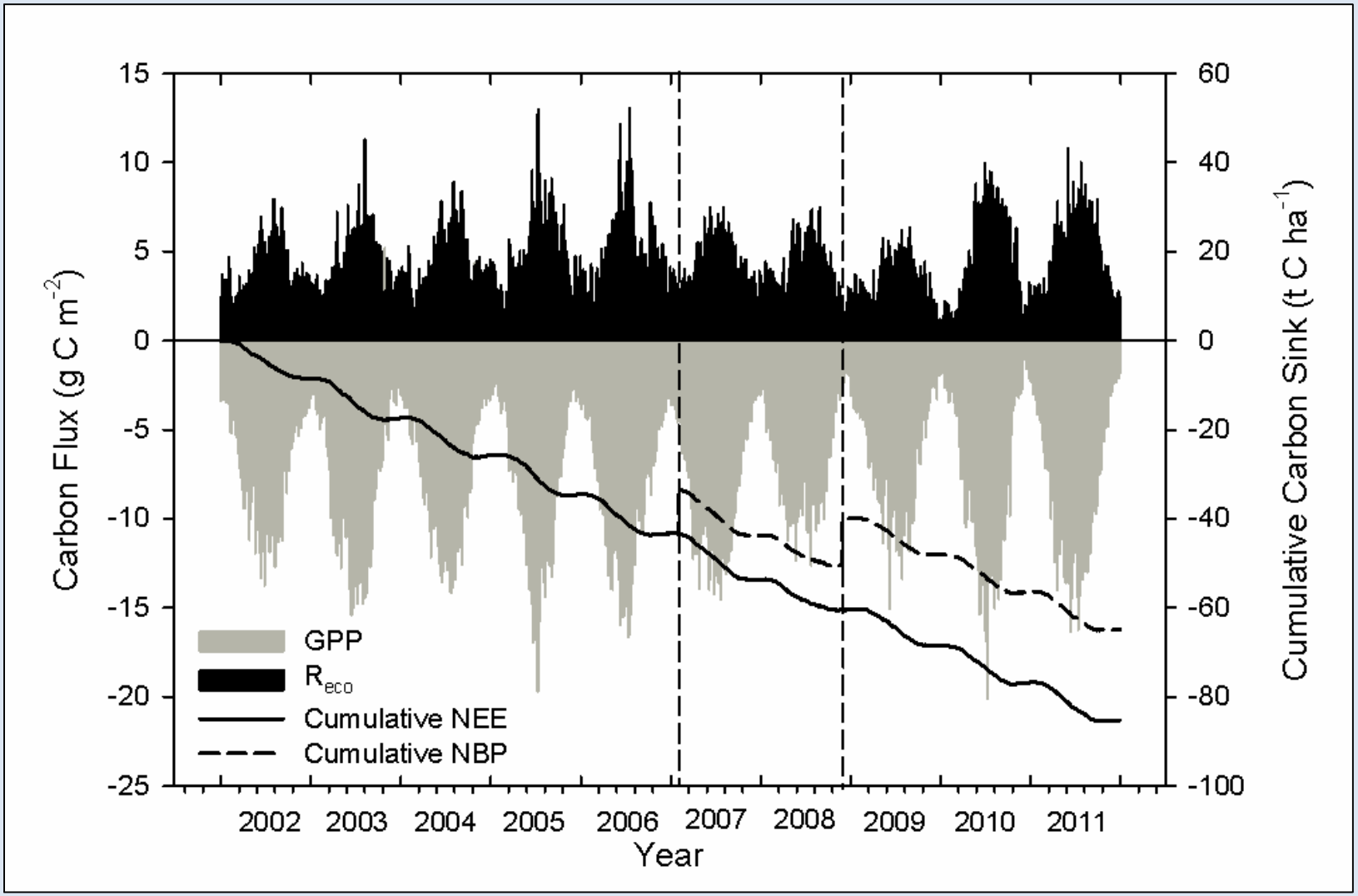
Carbon budget of Irish Forests – European context?



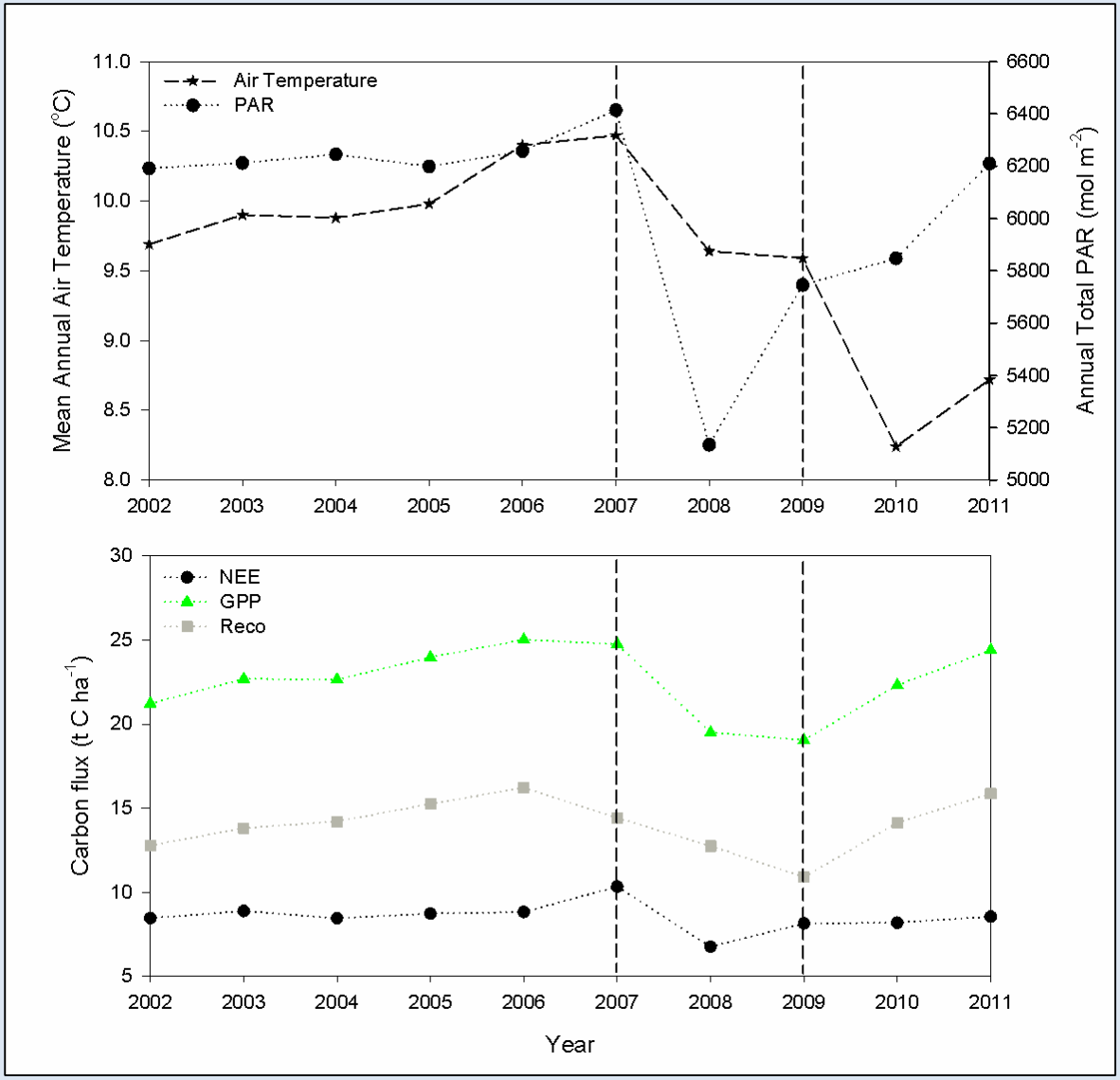
Van Dijk *et al.*, 2004

Forest thinning.

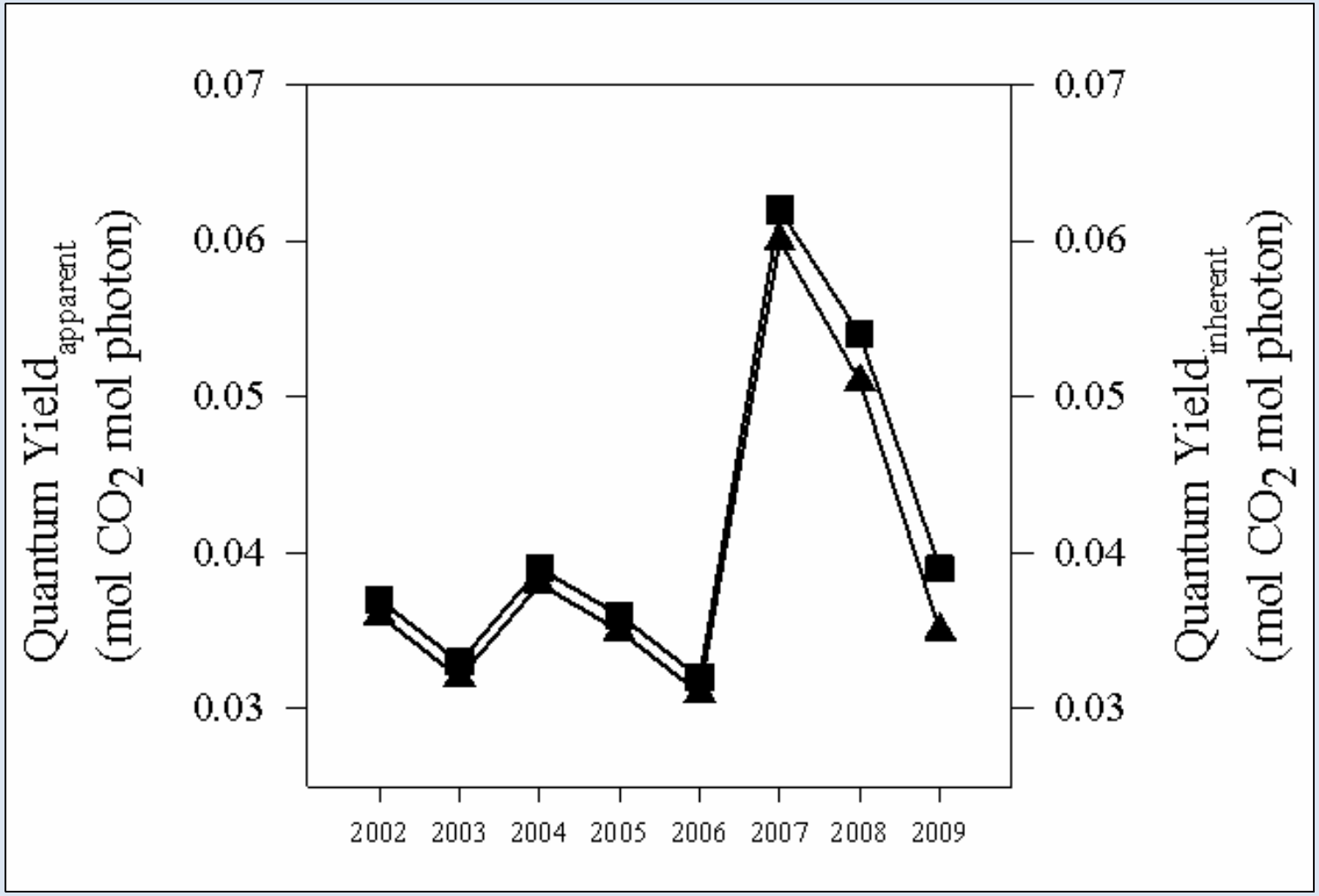
Long-term eddy covariance data-set



Flux components and MET data



Impacts of thinning on photosynthetic efficiency



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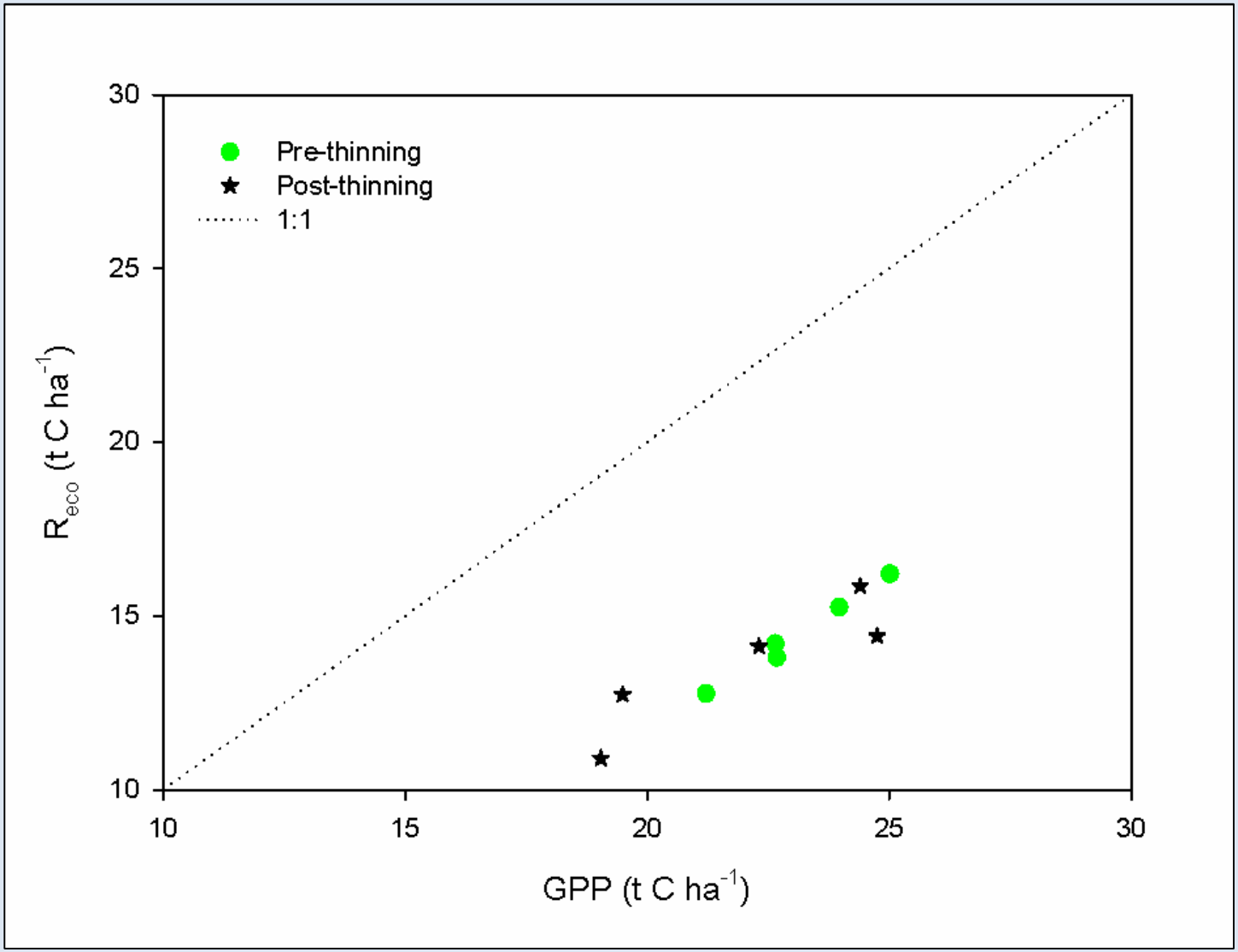

Summary

• ***All sites*** acted as a ***net carbon sink***, but the sink strength differed between ***coniferous*** and ***deciduous*** forest systems.

• The carbon sink strength ***increased*** with forest age across both chronosequences due to increased ***carbon assimilation***.

• While ***forest thinning*** reduced net stand carbon stock, ***NEE*** did not decrease as expected.

• ***Climatic variability*** influences both the magnitude of the forest carbon sink and also the response of the forest to disturbance events such as thinning.