Ecosystem carbon-water interactions of tropical Pasture and Afforestation

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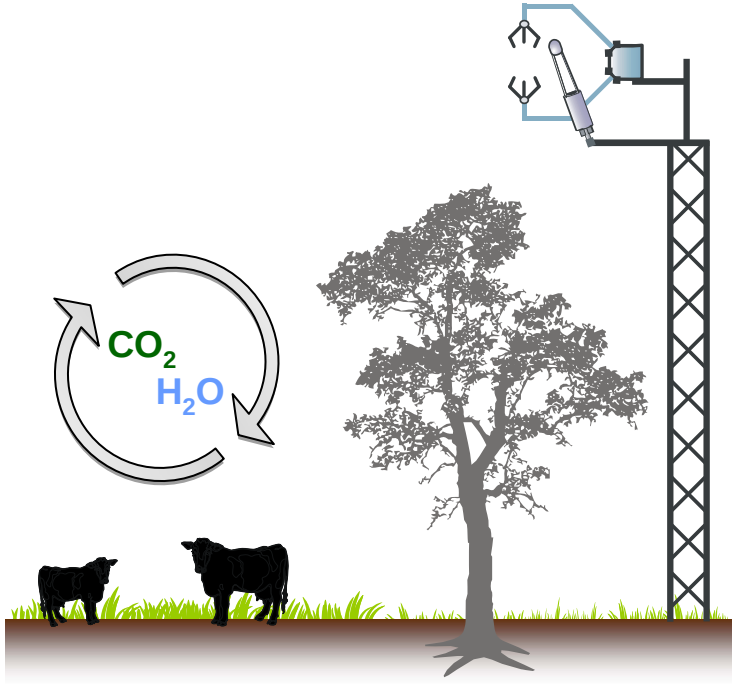

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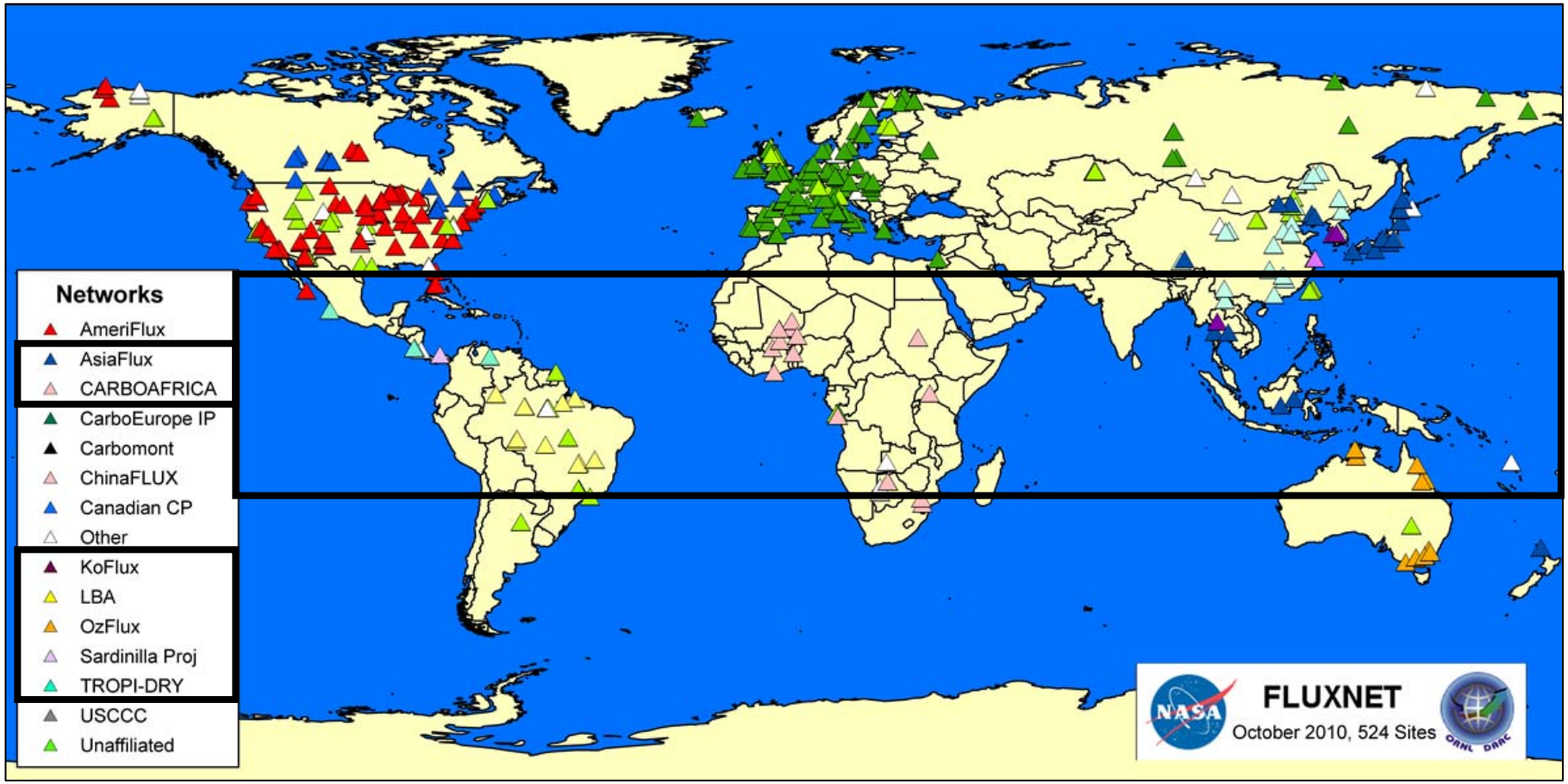
FLUXNET sites – global distribution

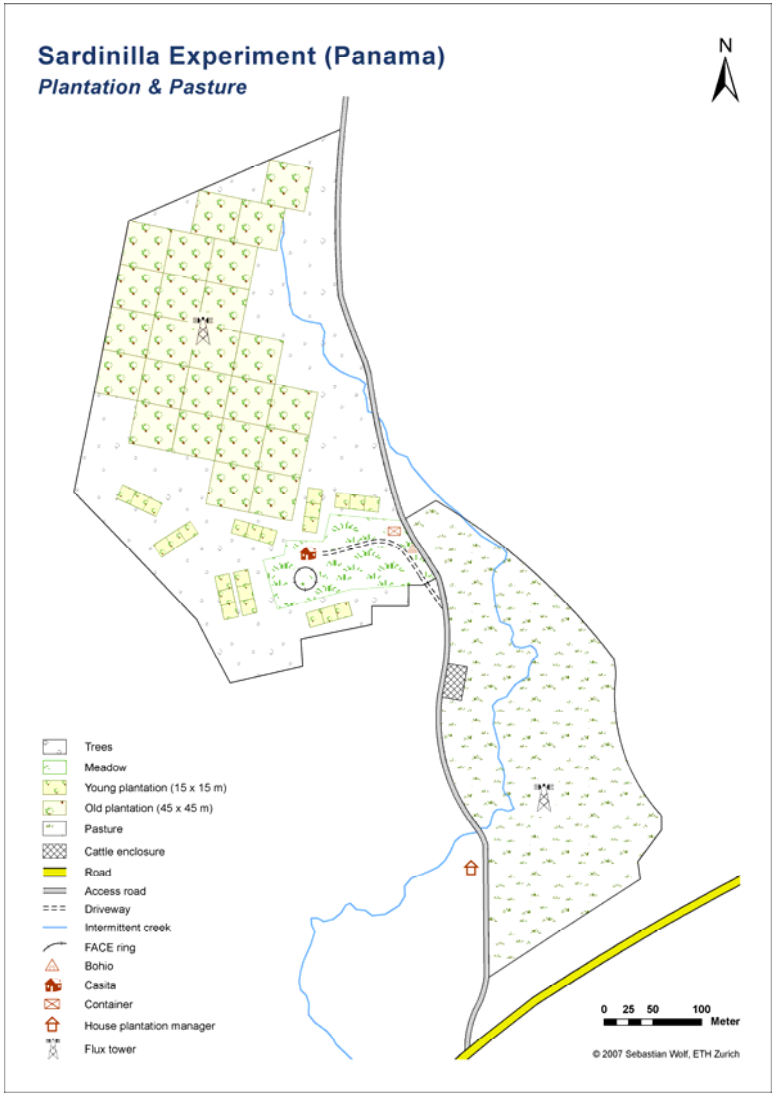


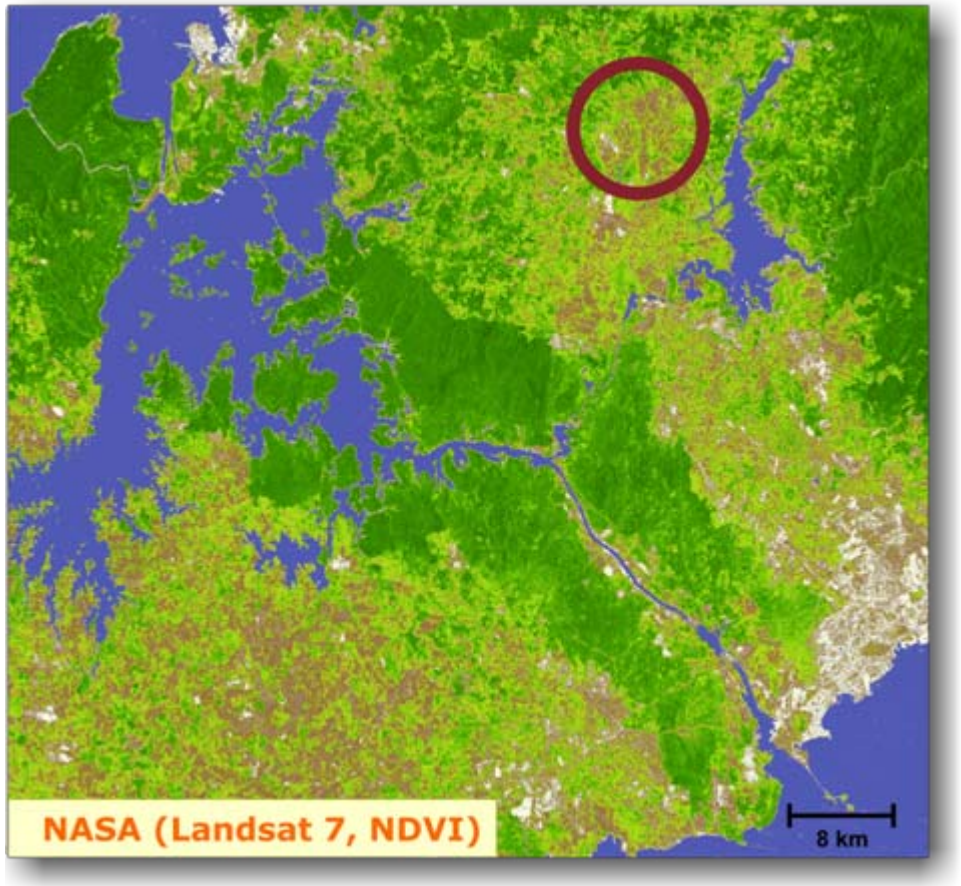
Motivation & Objectives

- Mainly tropical forest, few other land-use types:
  - Croplands (3 sites), Pastures (4), Afforestations (1)
- Little known about role in tropical C and H_2O cycle
  - Controls? Drought sensitivity? Changing climate?
  - C sinks or sources? Carbon-water interactions?

- Objectives:
  - Investigate NEE and ET of tropical Pasture & Afforestation in Sardinilla, Panama
  - Main focus: seasonality, C budgets and carbon-water interactions

Sardinilla, Location



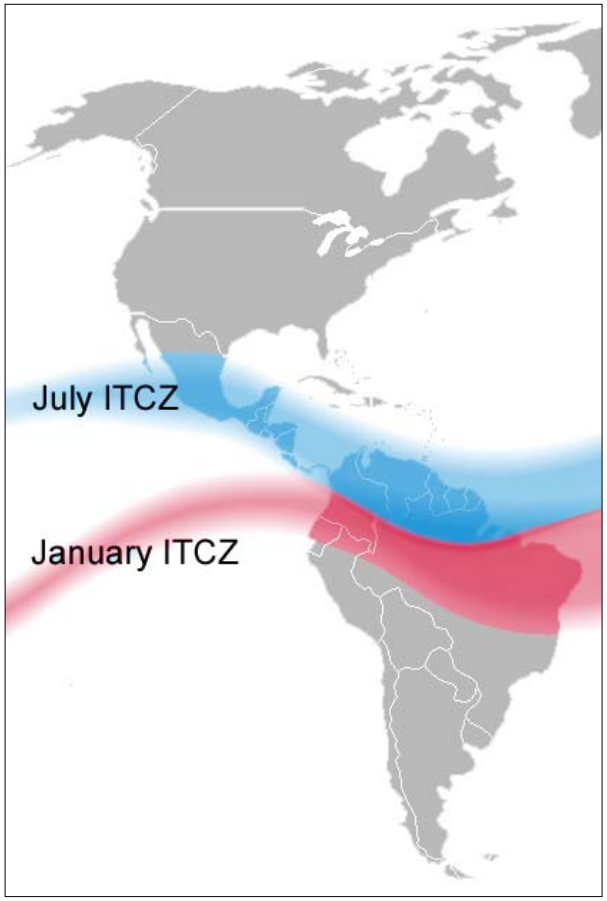


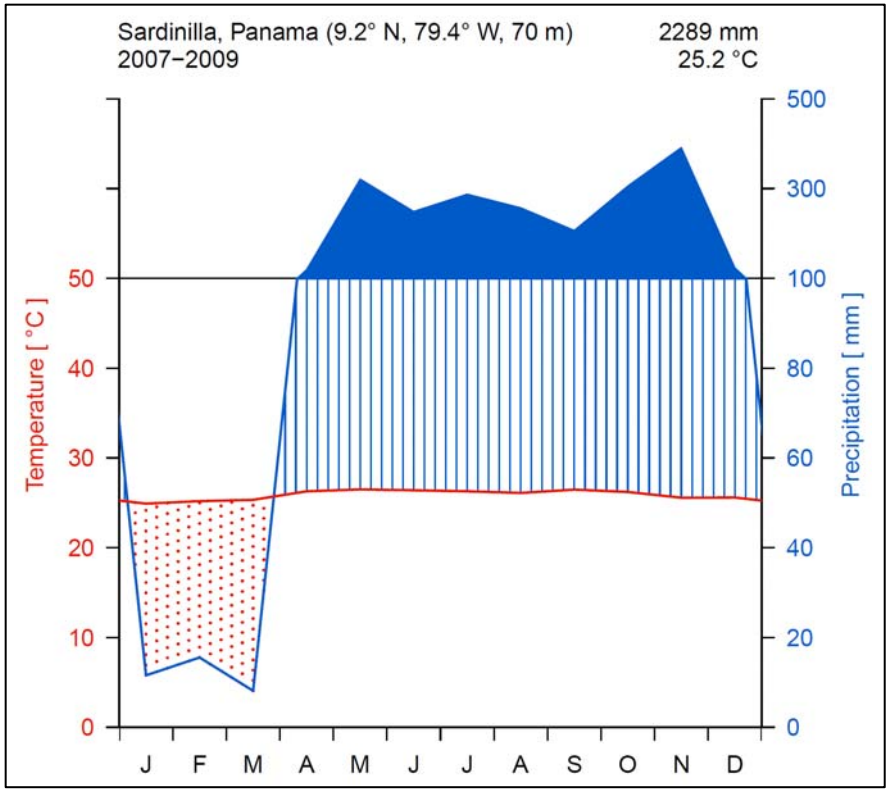
Sardinilla, Land-use

- Logged in 1953 ⇒ 2 years cropland ⇒ Pasture
  - Dominated by C_4 grasses, grazing

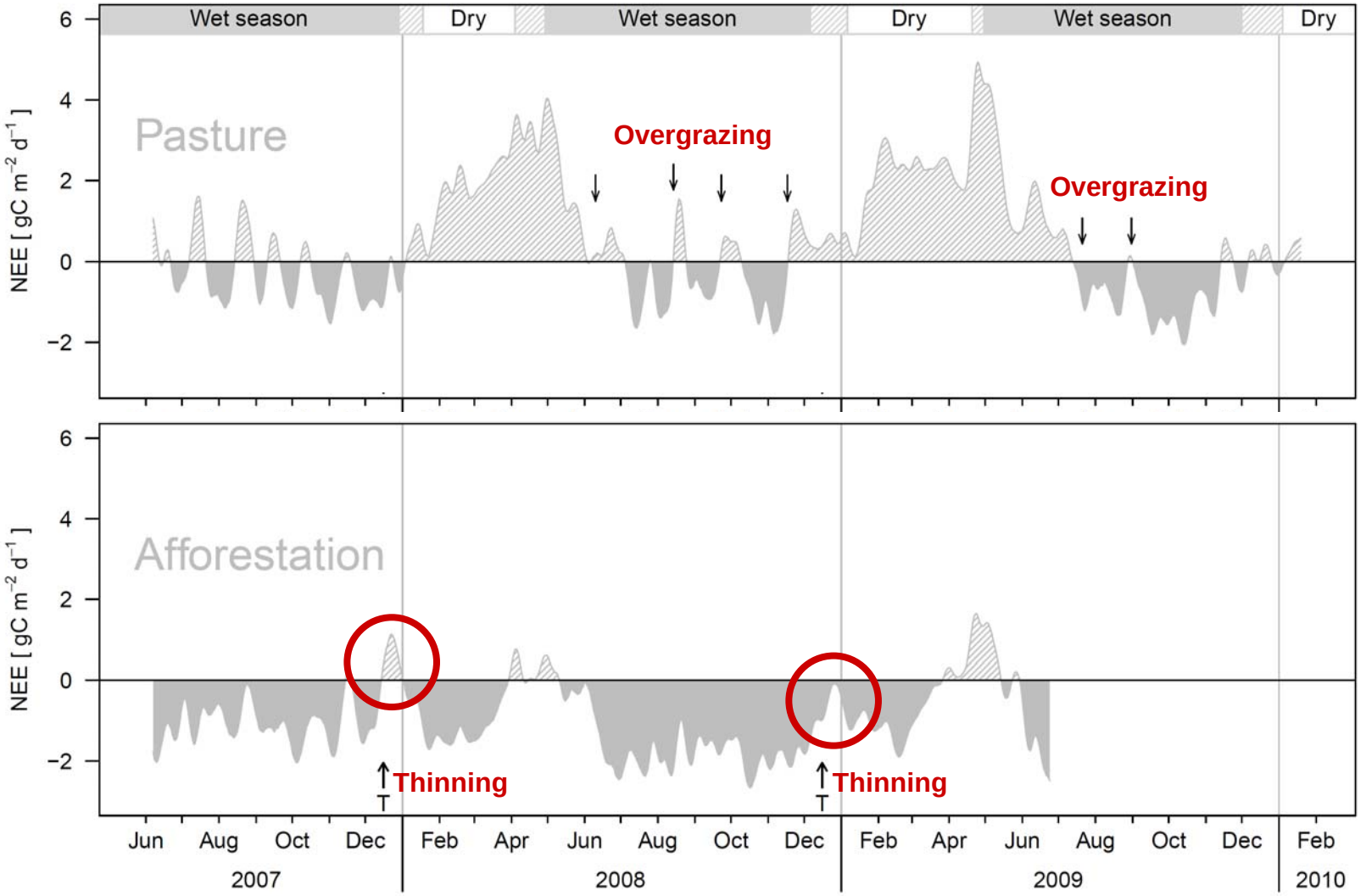
- 2001: Pasture ⇒ Afforestation (in parts)
  - Native tree species in mixture

Sardinilla, Climate

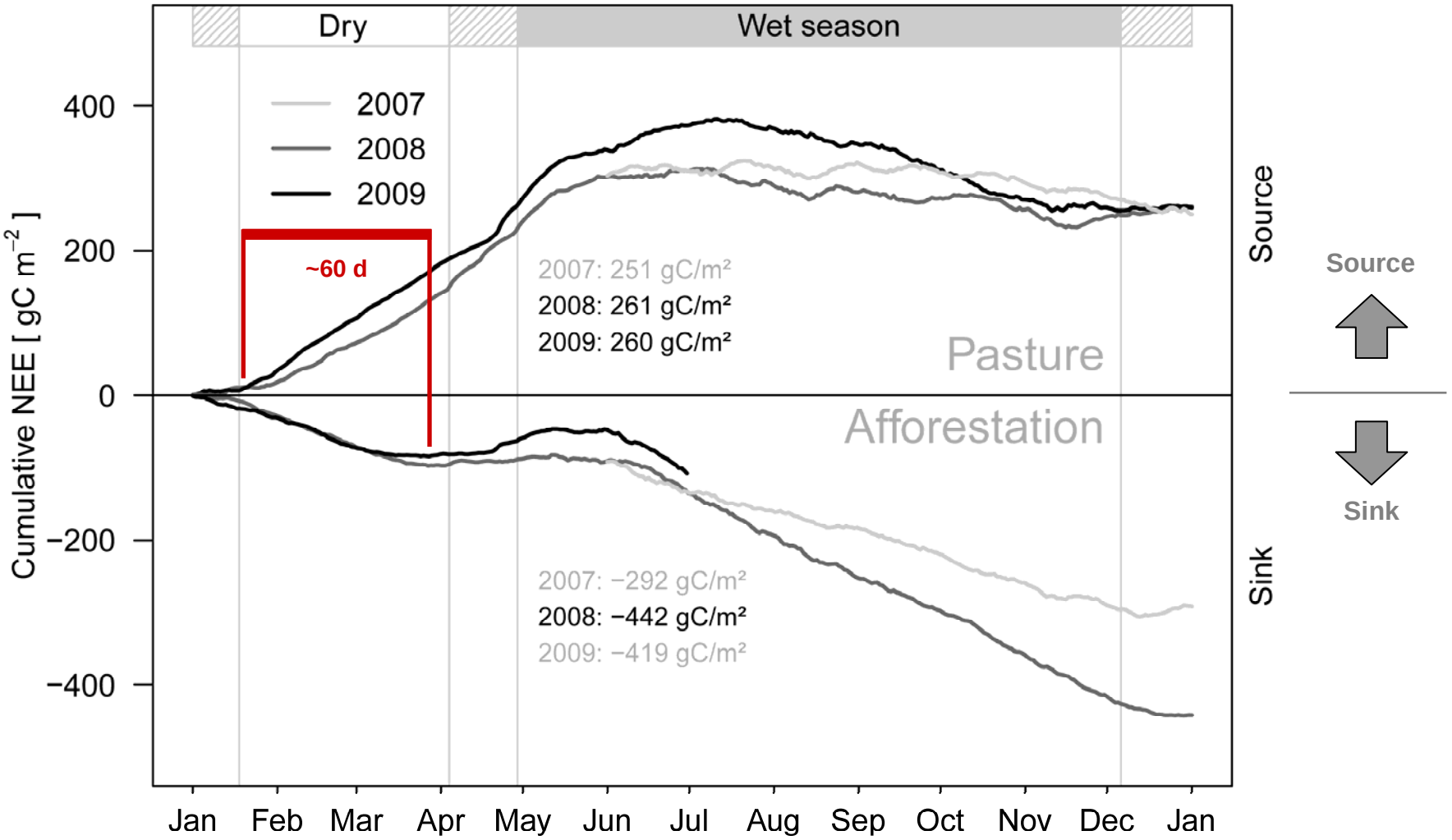




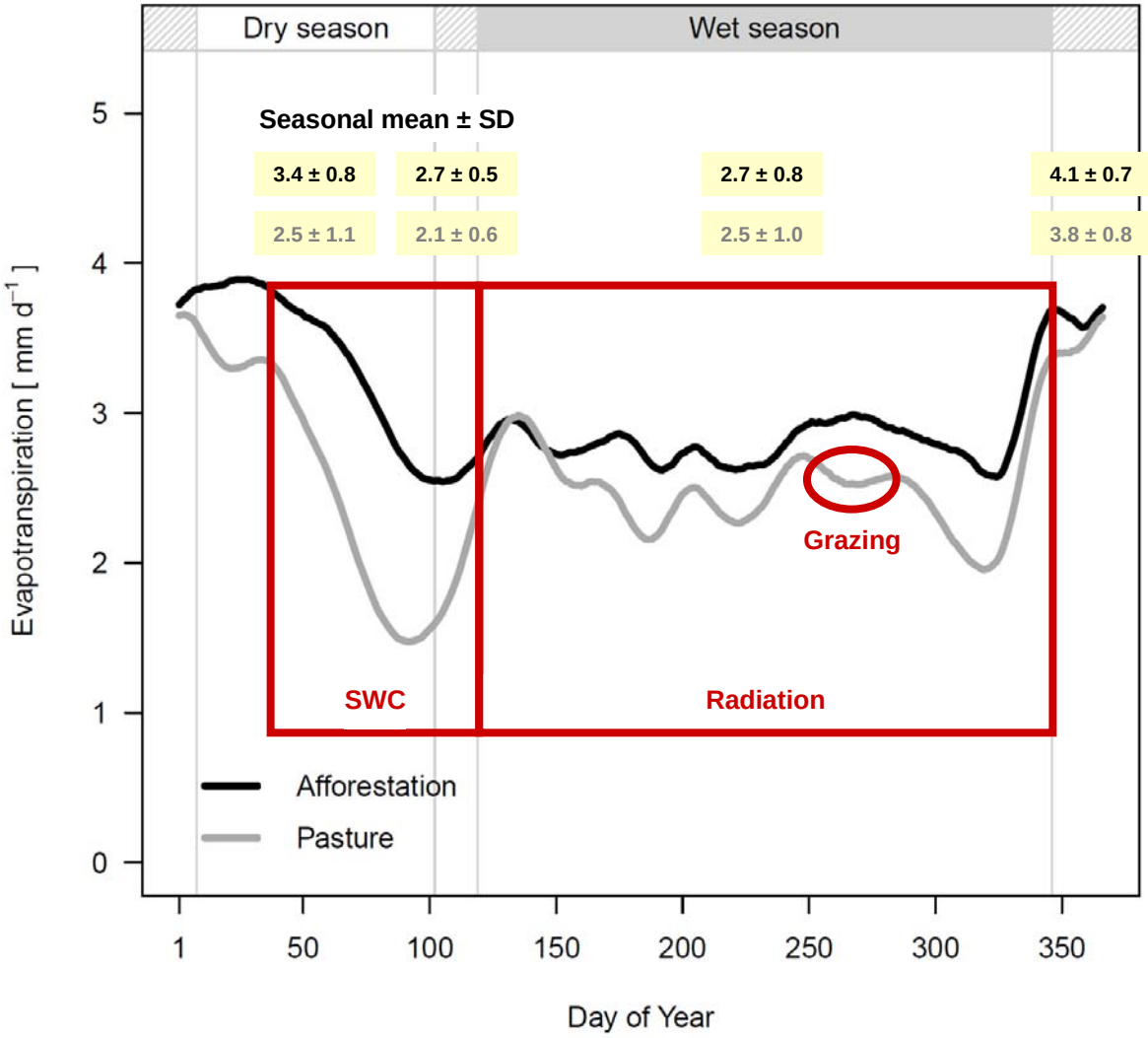
Seasonal variations in NEE



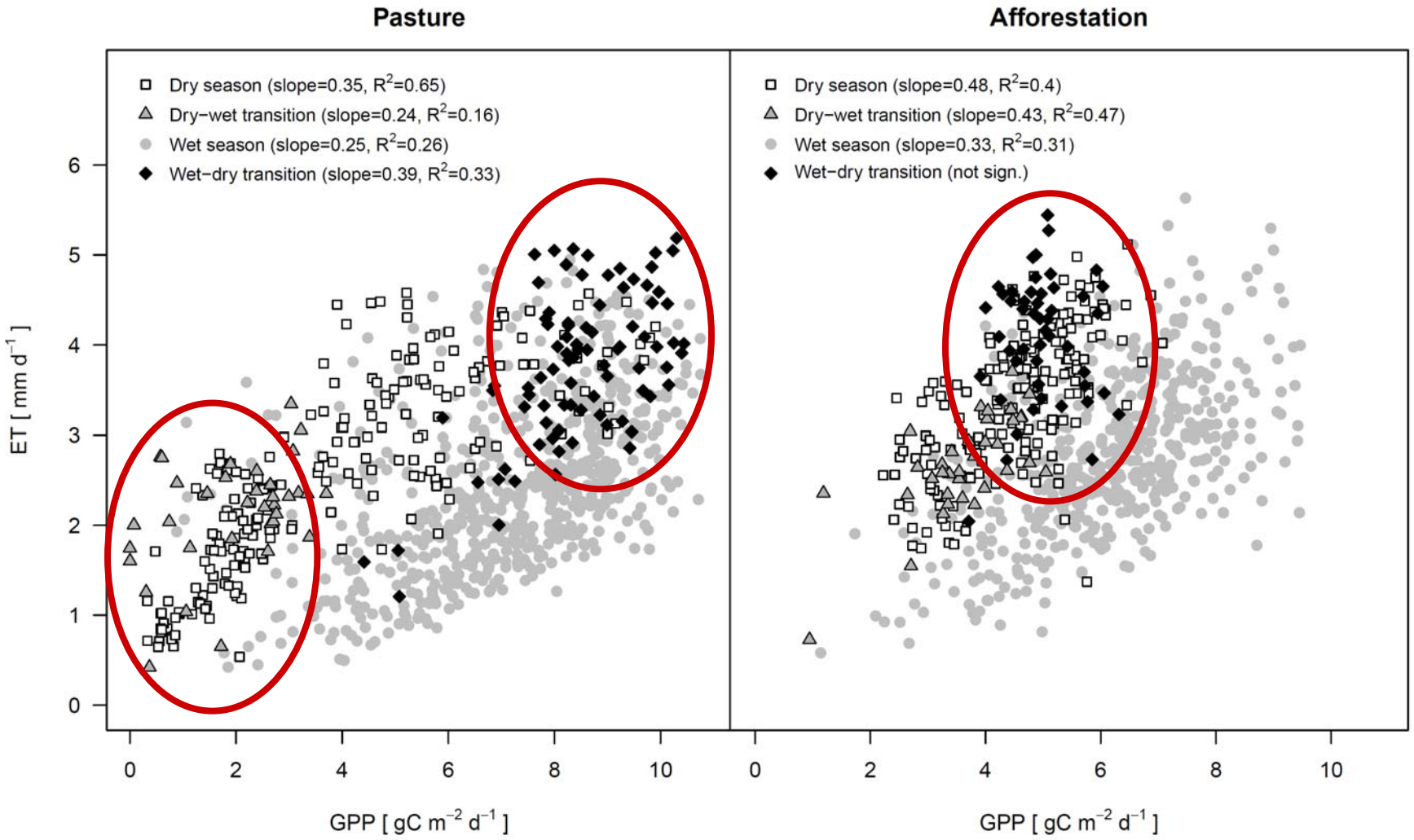
Carbon budgets



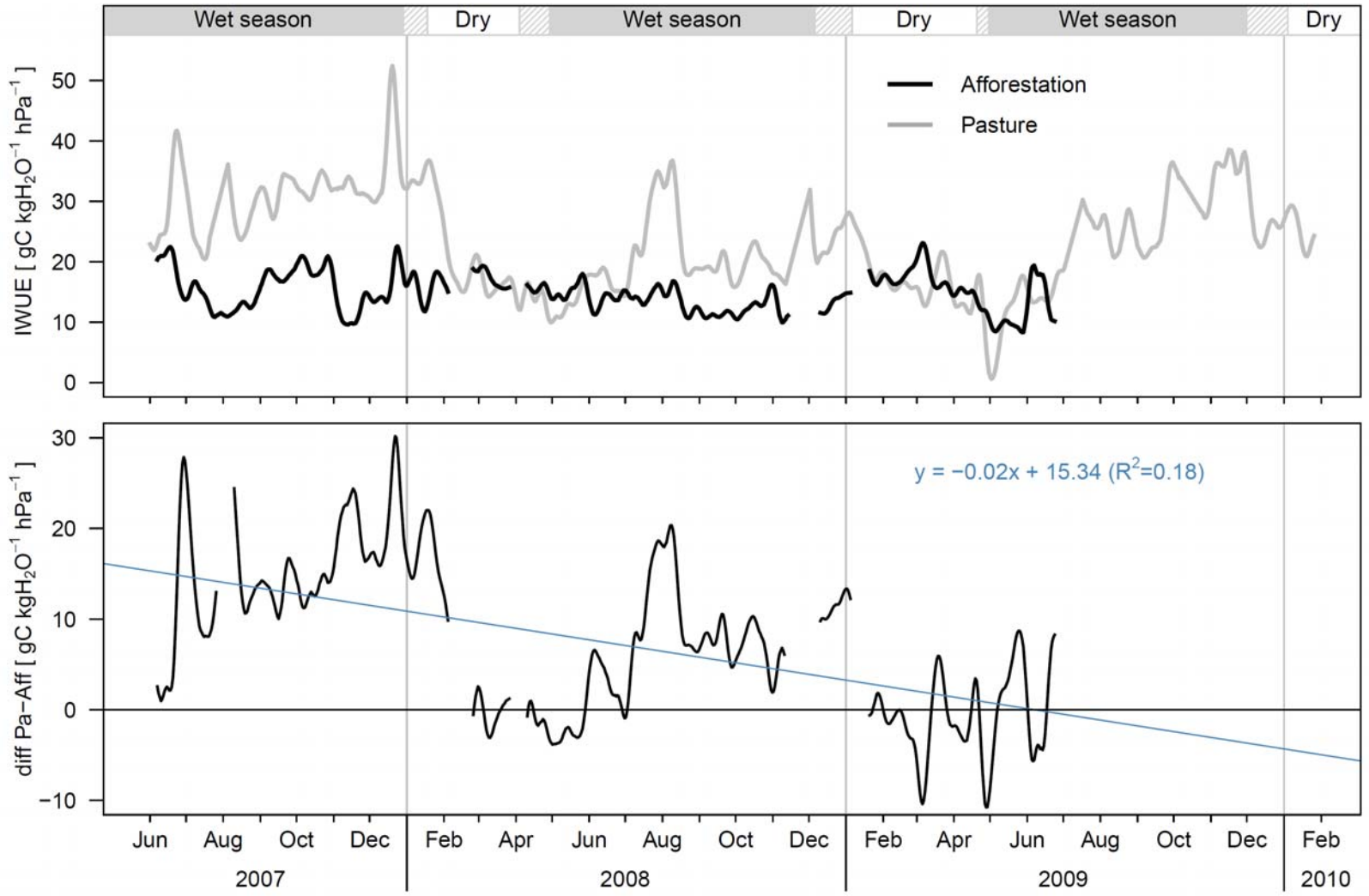
Seasonal variations in ET



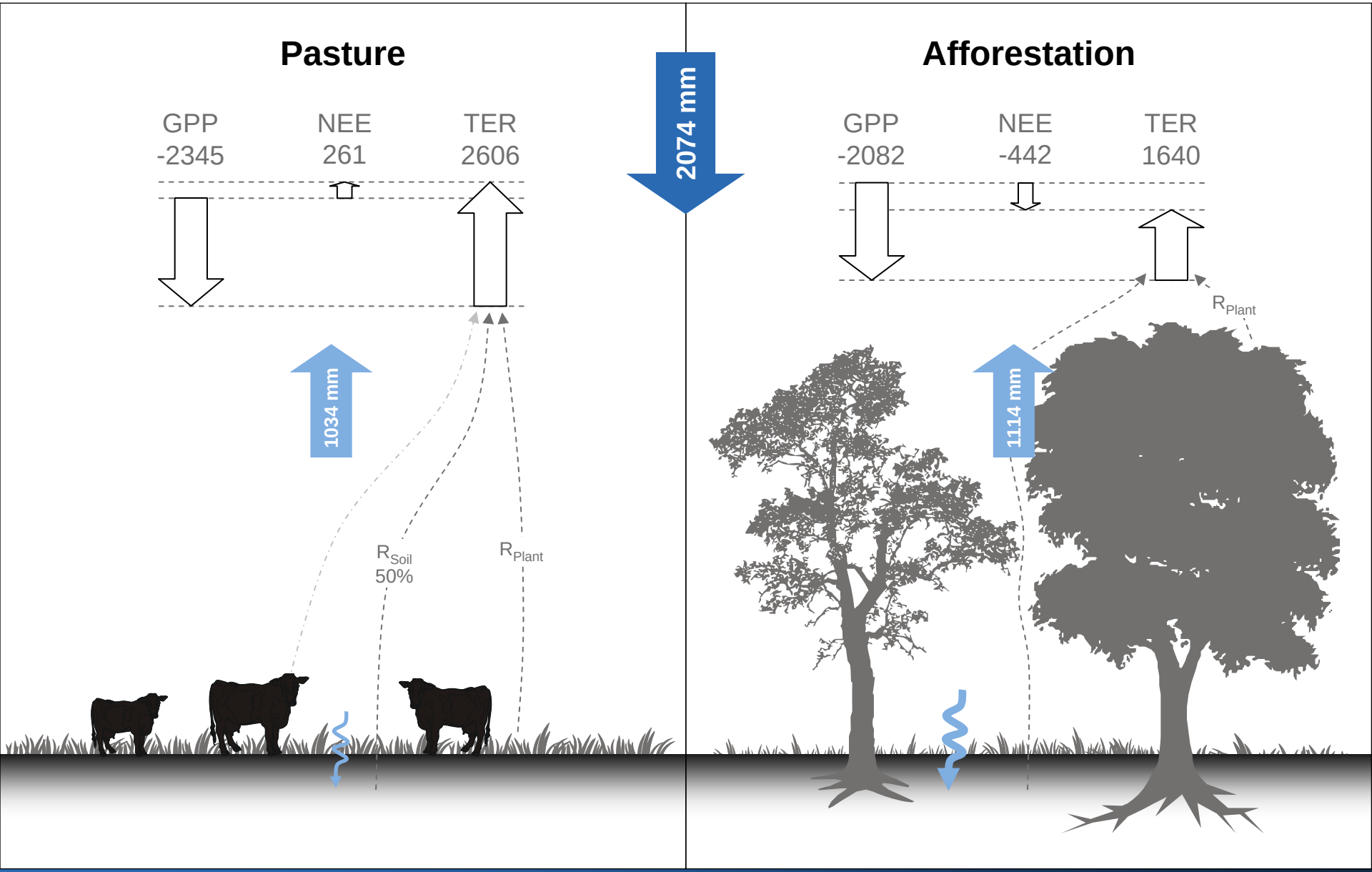
Carbon-water interactions



Water use efficiency



Carbon and water fluxes in 2008



Carbon fluxes in gC m^{-2} yr^{-1} and water fluxes in mm yr^{-1}

Summary & Conclusions

- Afforestation was strong carbon sink
- Pasture was substantial carbon source
  - Sensitivity to seasonal drought and overgrazing
- Conversion Pasture $\Rightarrow$ Afforestation
  - Reduced seasonal variations of NEE and ET
  - Enhanced resilience to seasonal drought
  - Marginally affected annual ET, strongly increased infiltration
- Strong seasonality in carbon-water interactions
- WUE differences decreased

Thanks for your attention!

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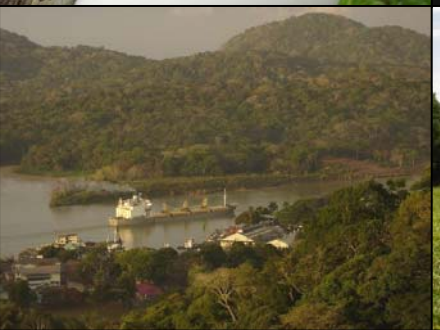

North-South Centre
Research for Development

Smithsonian Tropical Research Institute

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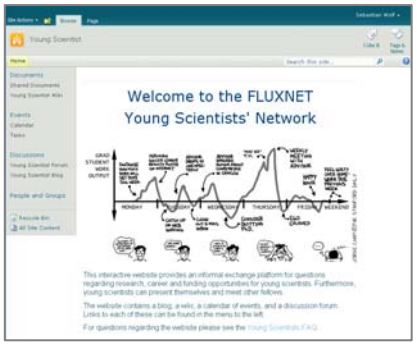
FLUXNET Young Scientist Network (YSN)

- Young Scientist (YS) = Students & Postdocs
- Mailing list & interactive Website:
  - Informal exchange platform for questions regarding research, career & funding
  - YS can present themselves and meet others through this network
- FLUXNET Website – About FLUXNET – Young Scientist Network (www.fluxnet.ornl.gov/fluxnet/youngscientists.cfm)



⇒ **Become part of the YSN & inform colleagues**