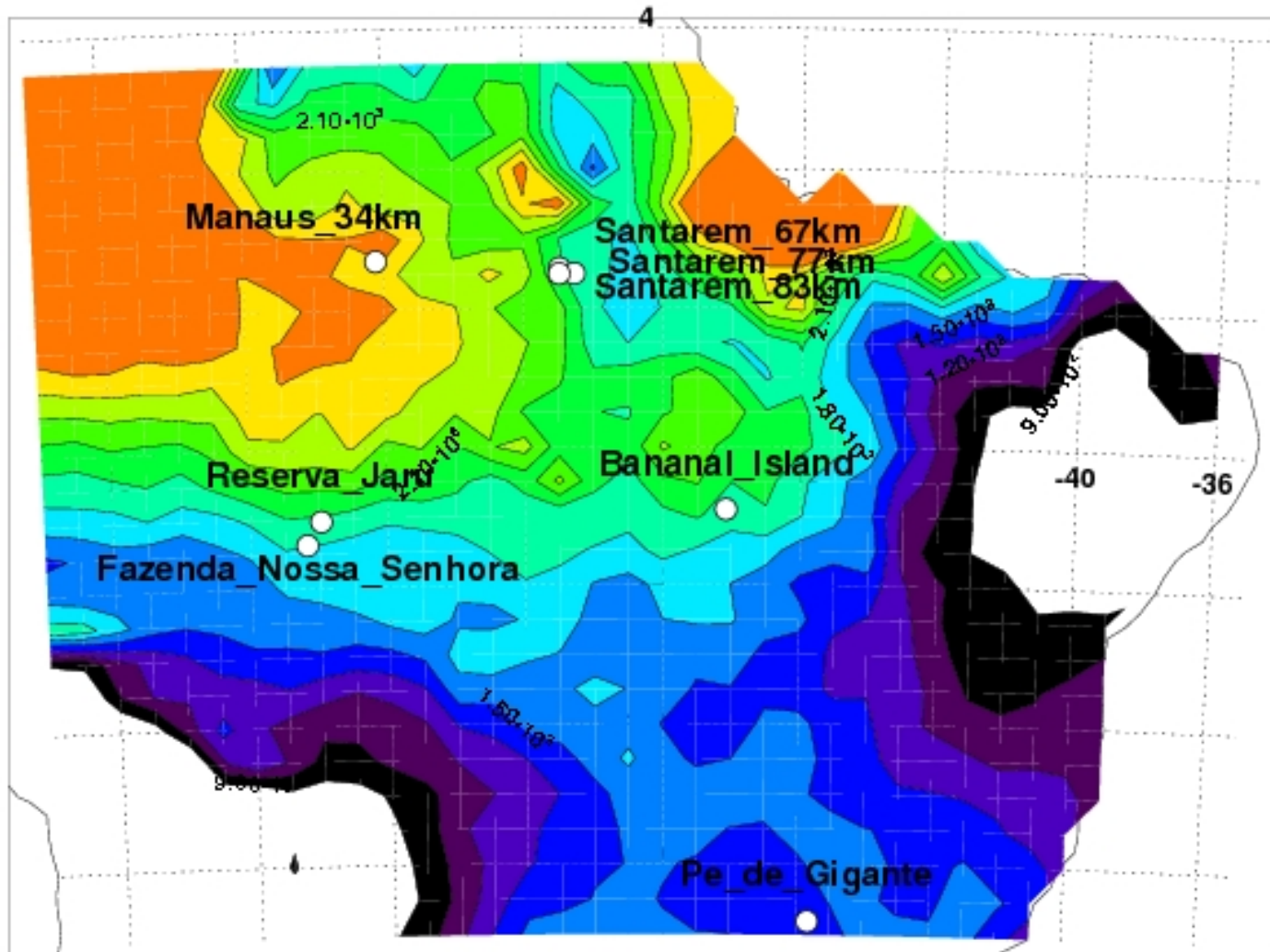
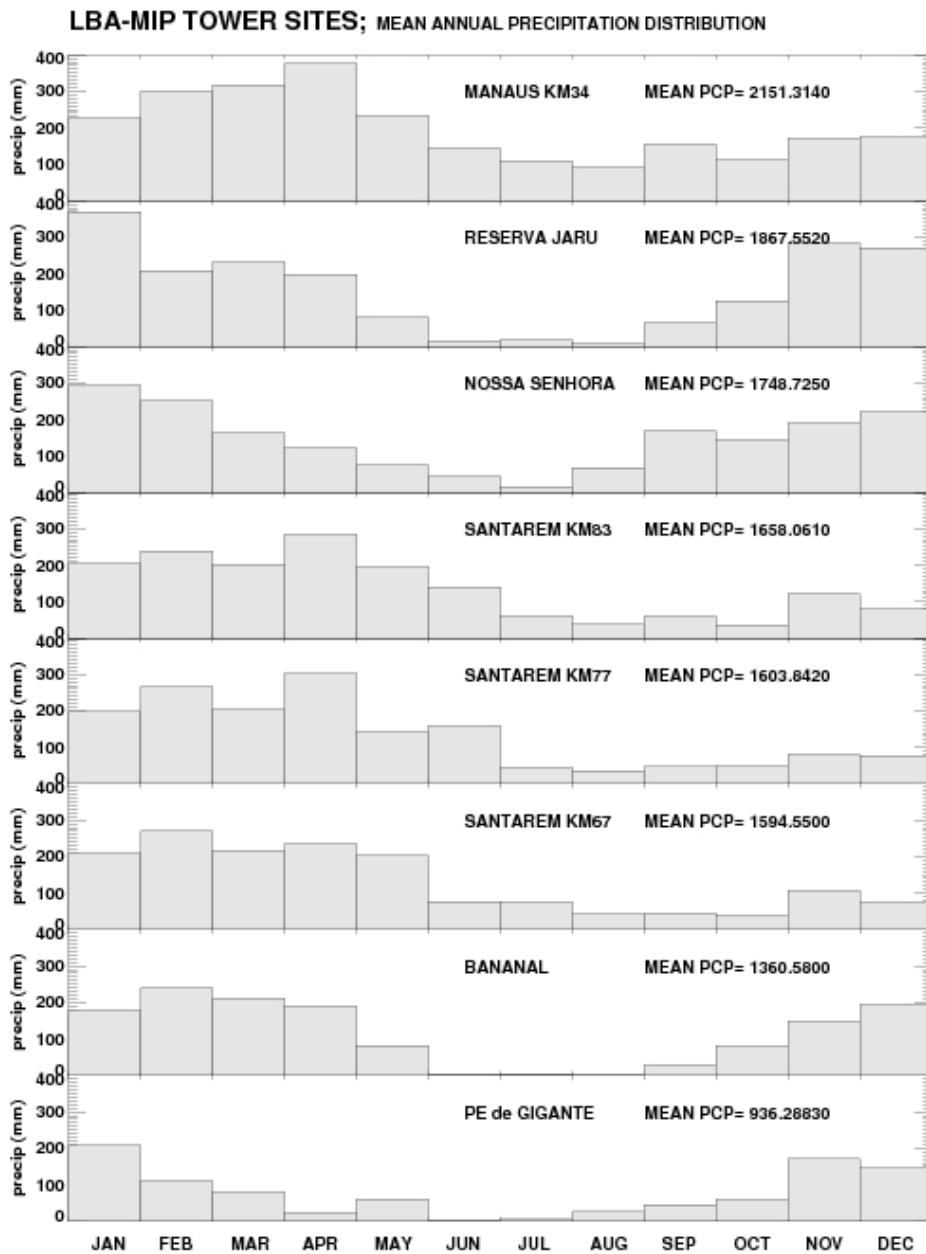


LBA-MIP: Annual Cycles of  
Surface Fluxes Across  
Vegetation and Moisture  
Gradients: Simulations using  
SiB3

Ian Baker, A.S. Denning, L. Prihodko,  
L.G.G. de Goncalves, N. Restrepo, H. da  
Rocha, S. Saleska, R. Stockli, I. Fung, M.  
Goulden, S. Miller, A. Manzi, A. Nobre

# Location of Sites





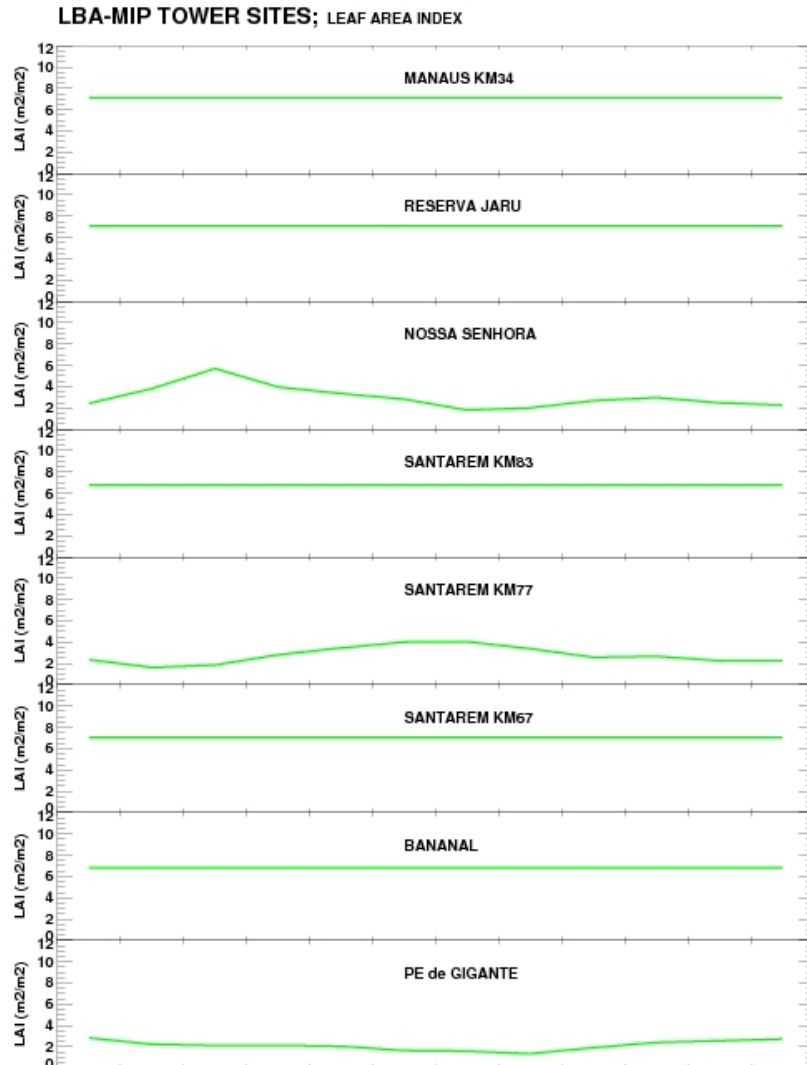
# Precipitation Distribution

- Precipitation mean for 3 or 4 years
- Dry season defined as number of months with precipitation < 100mm
- 0-1 month dry season at Manaus km34
- 7-8 month dry season at Pe de Gigante

# Site Characterization

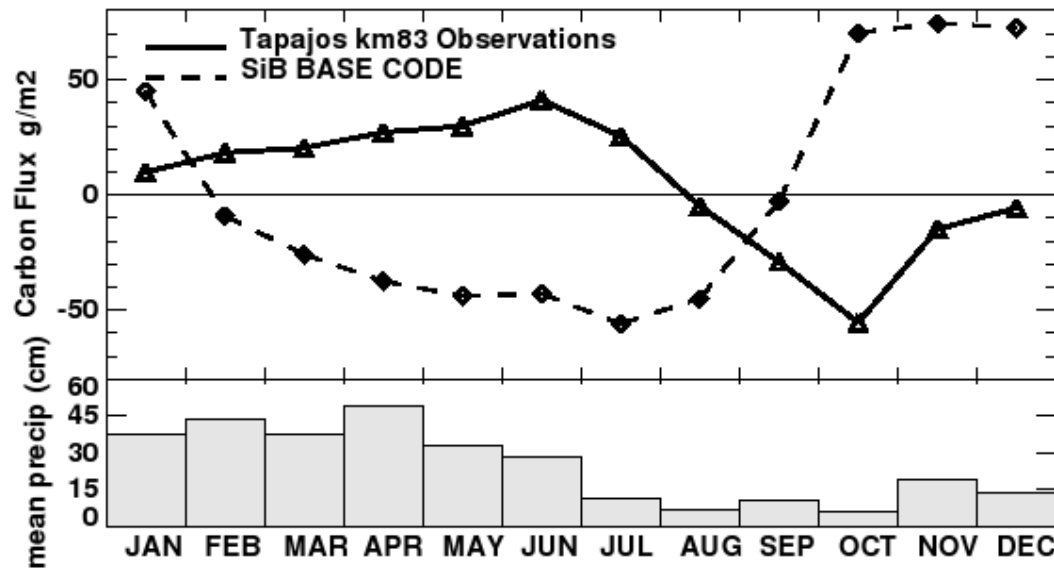
Site	Vegetation Type	Mean Precipitation
Manaus km 34	Broadleaf Evergreen	2151 mm
Reserva Jaru	Broadleaf Evergreen	1868 mm
Nossa Senhora	Pasture	1749 mm
Tapajos km83	Broadleaf Evergreen	1658 mm
Tapajos km77	Pasture	1604 mm
Tapajos km67	Broadleaf Evergreen	1595 mm
Bananal	Broadleaf Evergreen	1361 mm
Pe de Gigante	Savanna	936 mm

# Site Characterization-LAI



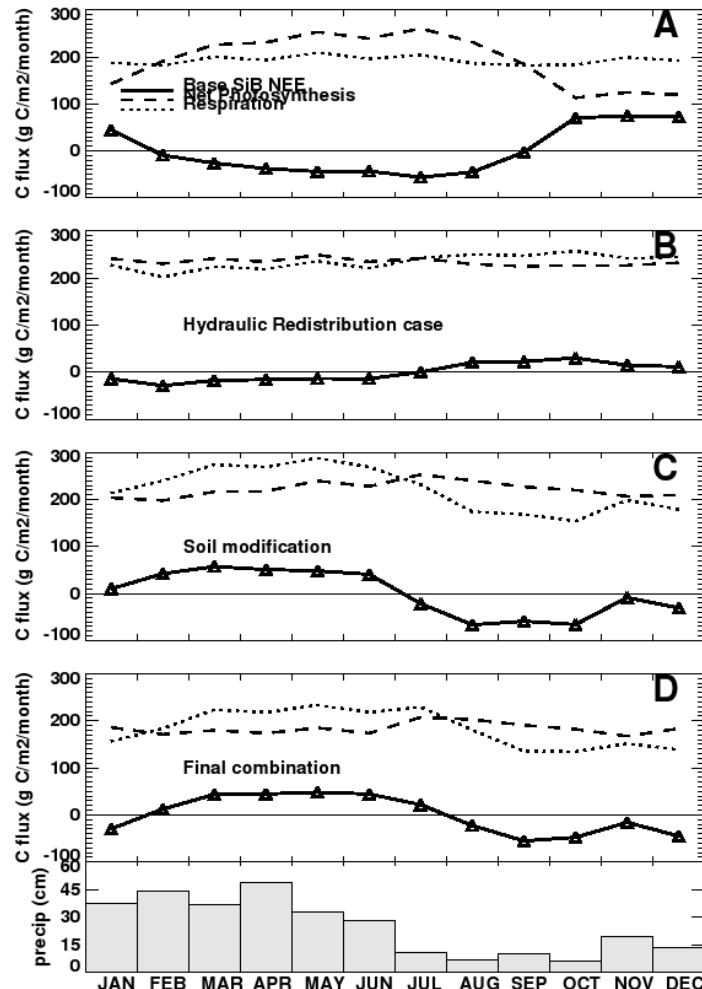
- Broadleaf Evergreen sites: hold constant at max NDVI value in the record (aerosol, cloud masking)
- Pasture, Savanna sites: use NDVI record
- Bananal: incorrect representation of vegetation?

# Background



- Base SiB code has inverted annual NEE cycle
- Canopy experiences soil moisture stress during seasonal dry

# Background (continued)



- Individual mechanisms don't completely modify the erroneous annual cycle

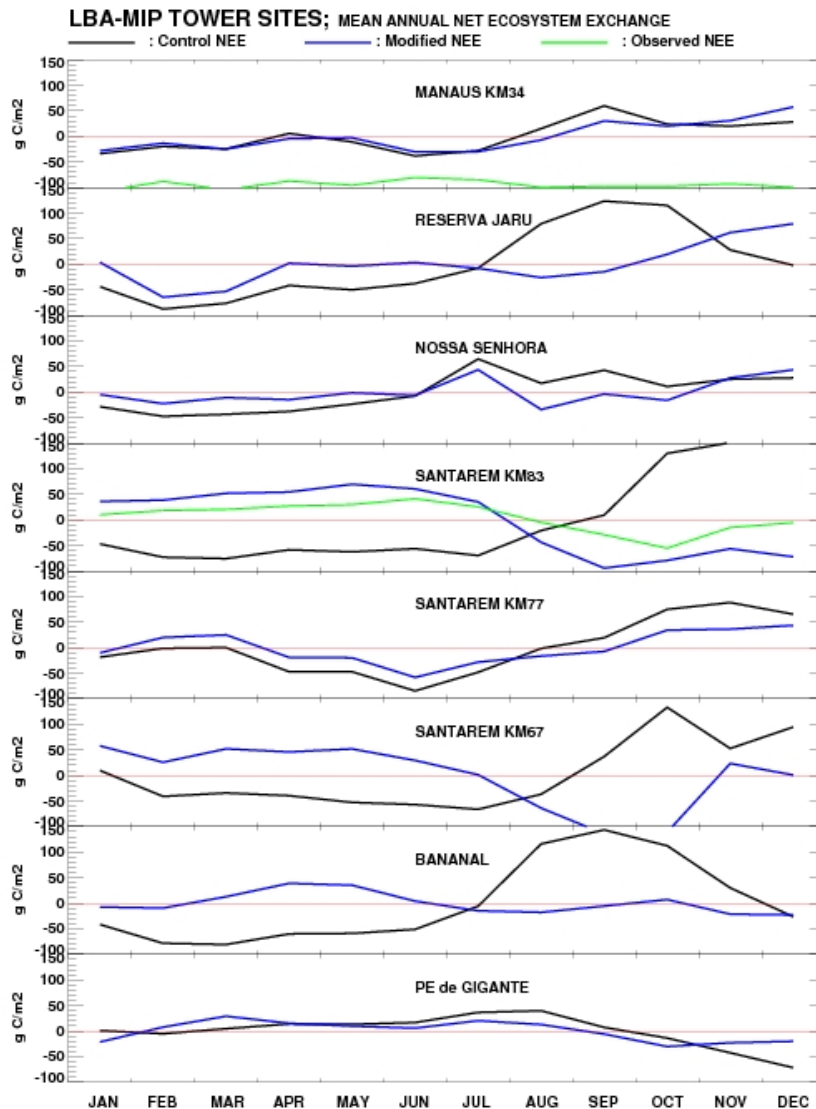
- In combination, we get a generally better model simulation

# Extending the Analysis to Multiple Towers

- Idea: apply final, combined mechanism analysis to all 8 tower sites
- In reality, model code was problematic at several locations (any site that was not broadleaf evergreen)
- Detailed analysis of 'what went wrong' is required for next round of simulations

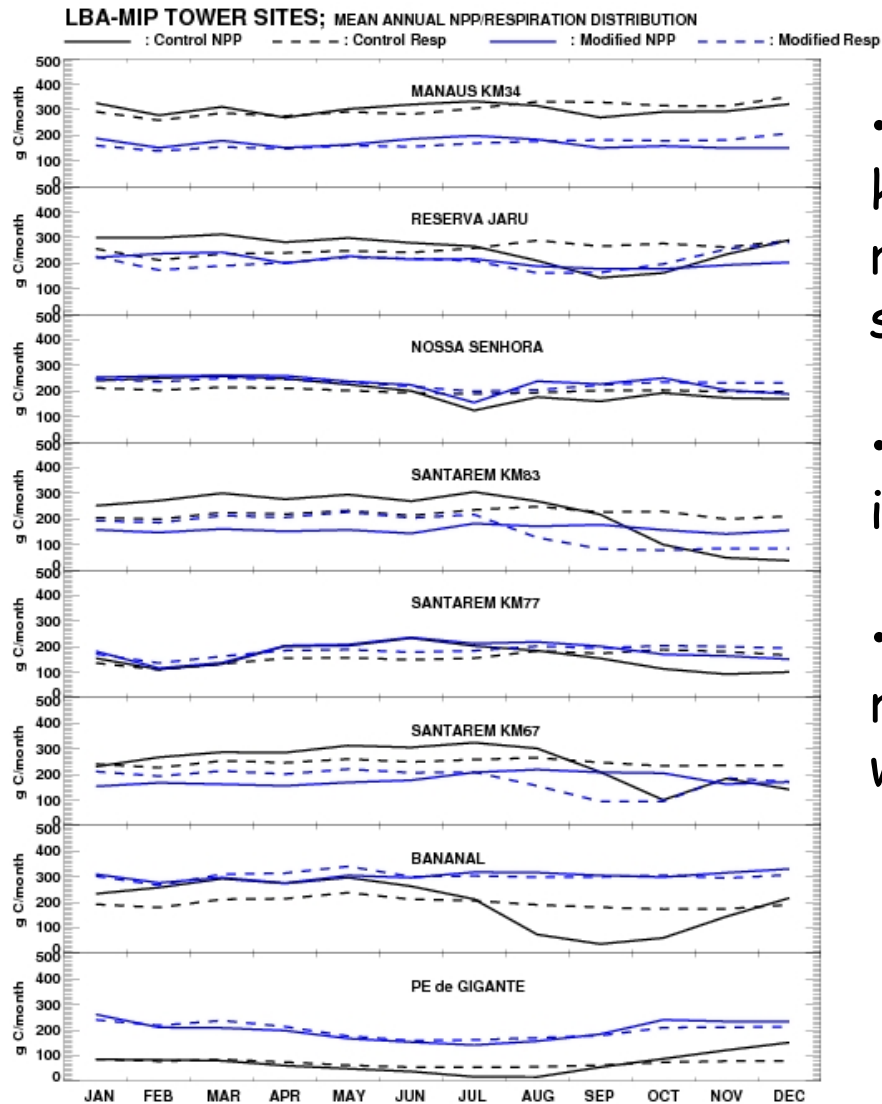


# Extending the Analysis to Multiple towers: II



- Monthly means for all sites; not ready to analyze individual years yet
- Manaus km34: observed sink always. SiB balances NEE
- Manaus km34: not much change using modified model
- Tapajos Broadleaf Evergreen sites (km67, km83): consistent
- Reserva Jaru: intermediate between km34 and Tapajos sites?
- Not much change at pasture sites (FNS, km77) nor at Savanna site (PDG)
- Bananal: incorrect vegetation in model?

# Extending the Analysis to Multiple towers: NPP vs Respiration

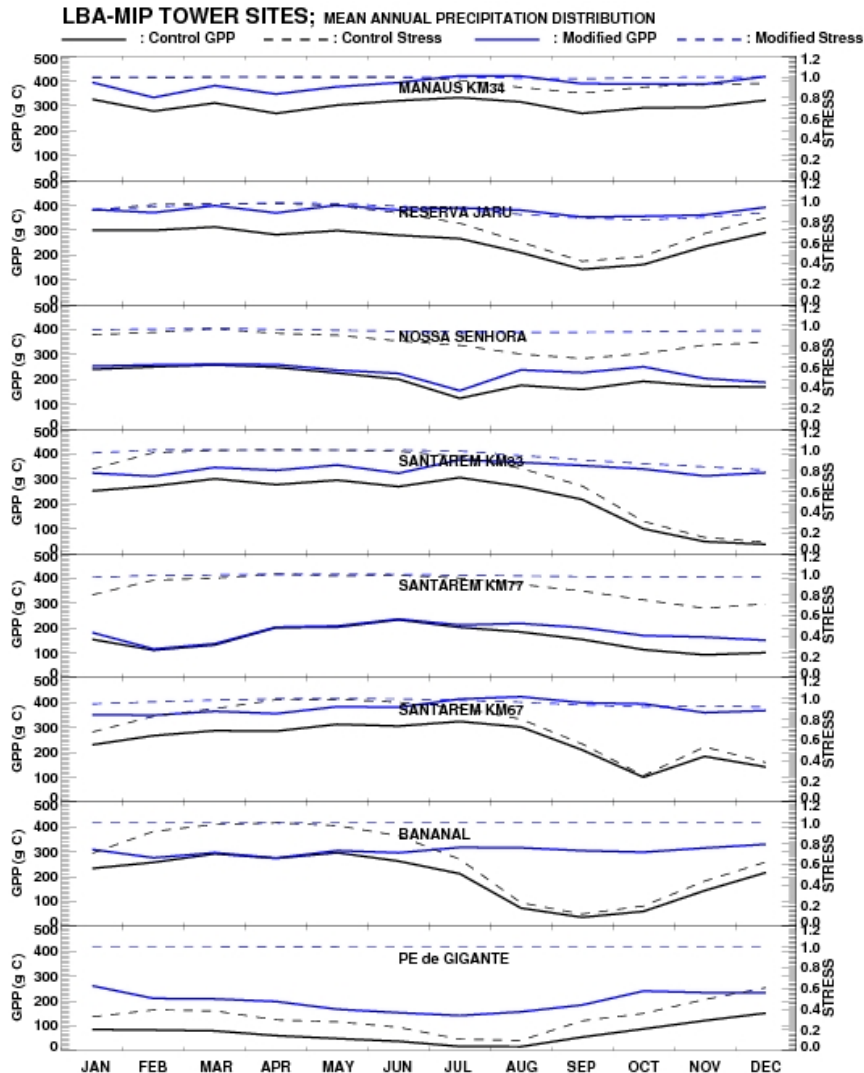


- Sites with large LAI (km34, RJA, km83, km67): sunlit/shaded code results in larger leaf respiration, smaller NPP

- 'Drier' sites (BAN, PDG): NPP increased

- All sites: seasonality from NPP removed. Is this correct, or have we overcorrected the model?

# Extending the Analysis to Multiple towers: GPP vs Soilmoisture Stress



- Stress: 1=> no stress/0=> total stress

- Stress unmodified at km34; all other sites show reduction in stress

- Is removal of stress from low-precipitation stations (BAN, PDG) realistic?

- We may need to incorporate soil depth information, and change rooting depth treatment

# What's Next?

- Confront simulations with observations:  
What do actual NEE/H/LE cycles look like?
- Utilize soil/rooting depth information in SiB
- Look at individual years, not composite means: How is interannual variability expressed? What are mechanisms?