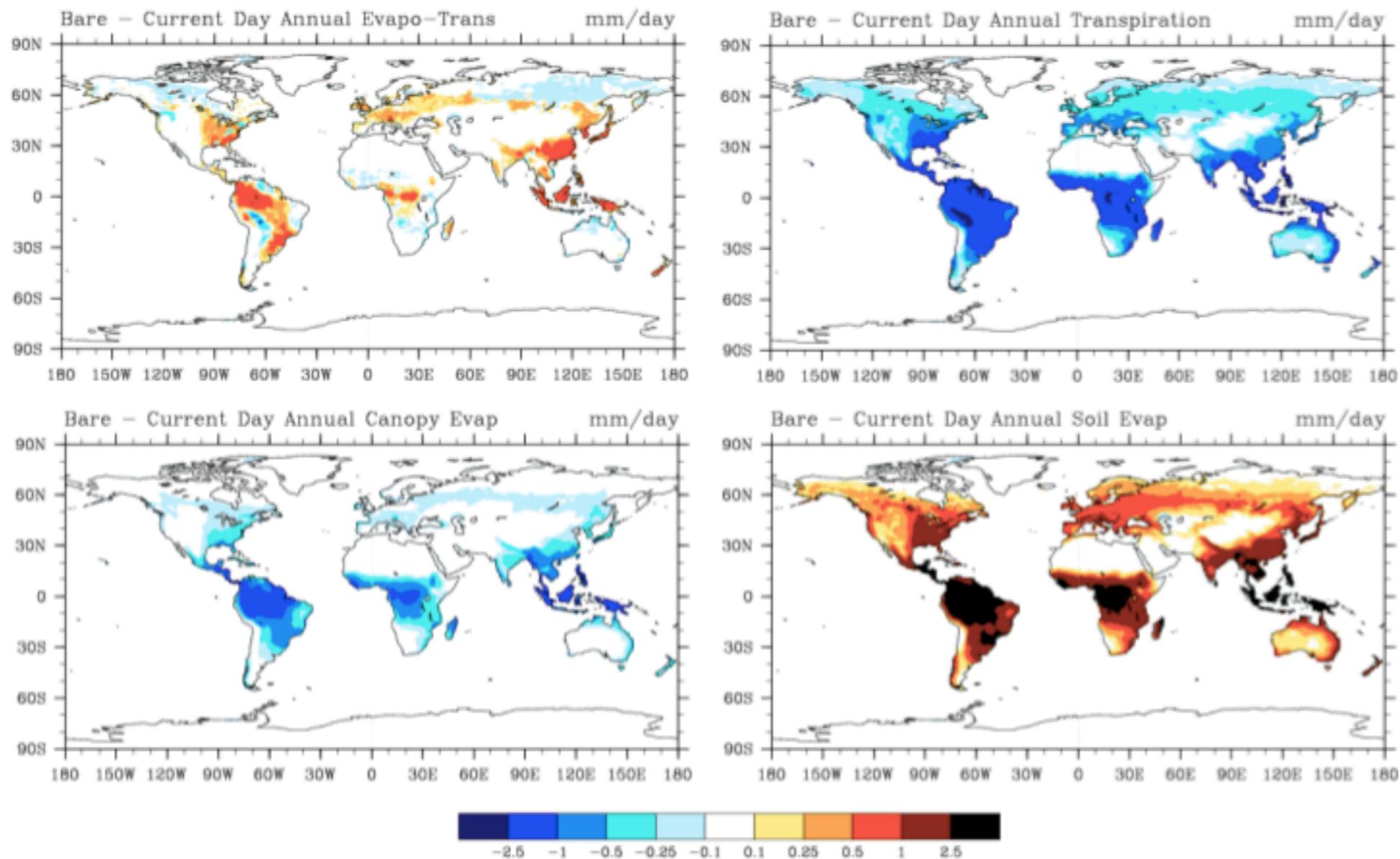


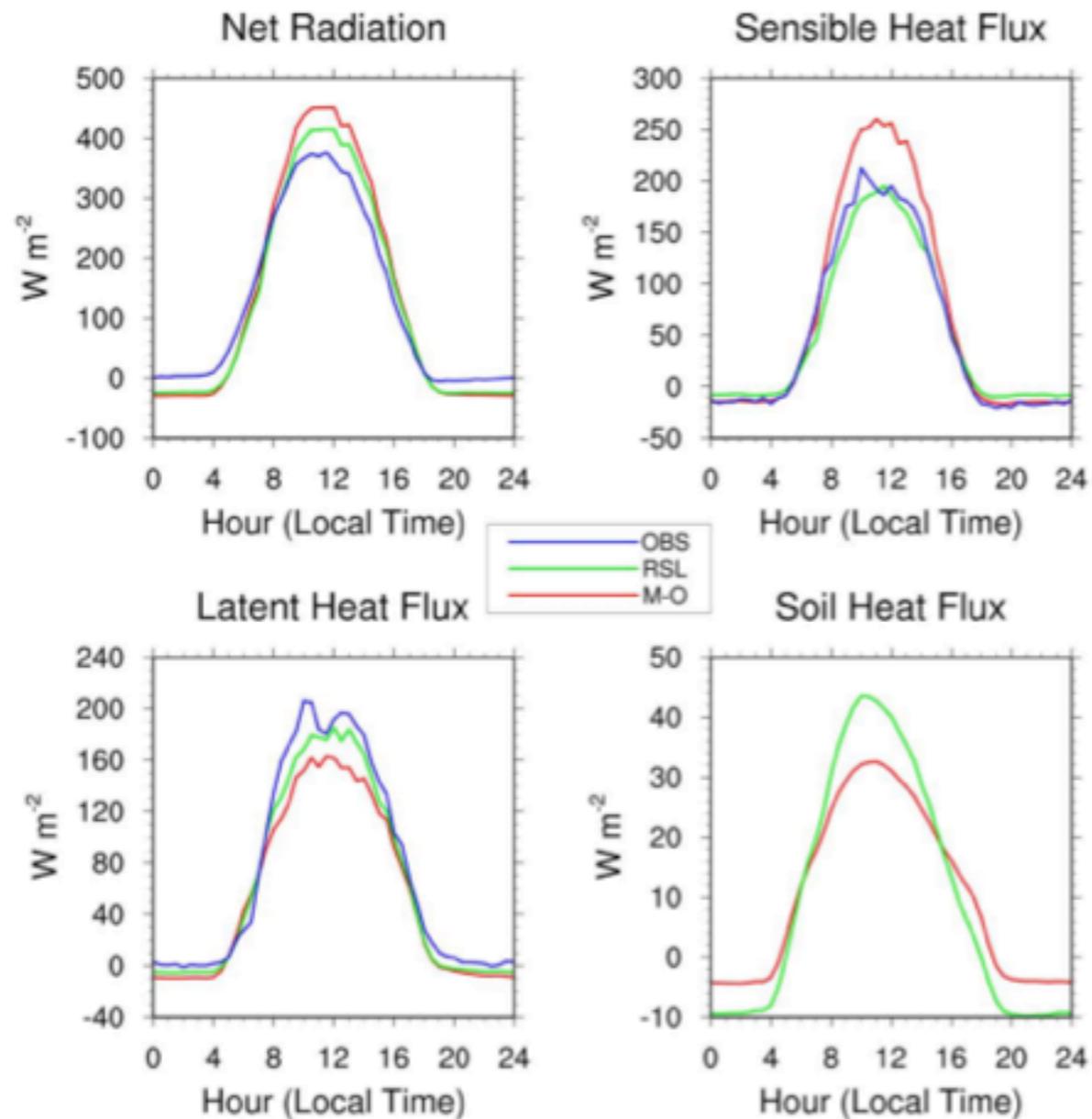
# Land Model Working Group: Summary

- Presentations:
  - Gordon Bonan
  - Ned Patton
  - Biljana Orescanin
  - Ian Baker
- Discussion

# 1. Gordon Bonan: Soil evaporation term in CLM. Problem with excessive evaporation with de-vegetation

- a. Tracked to new formulation, using litter amount and surface soil moisture 'beta' term
- b. Old formulation used SiB-type resistance term; nonphysical, but it works



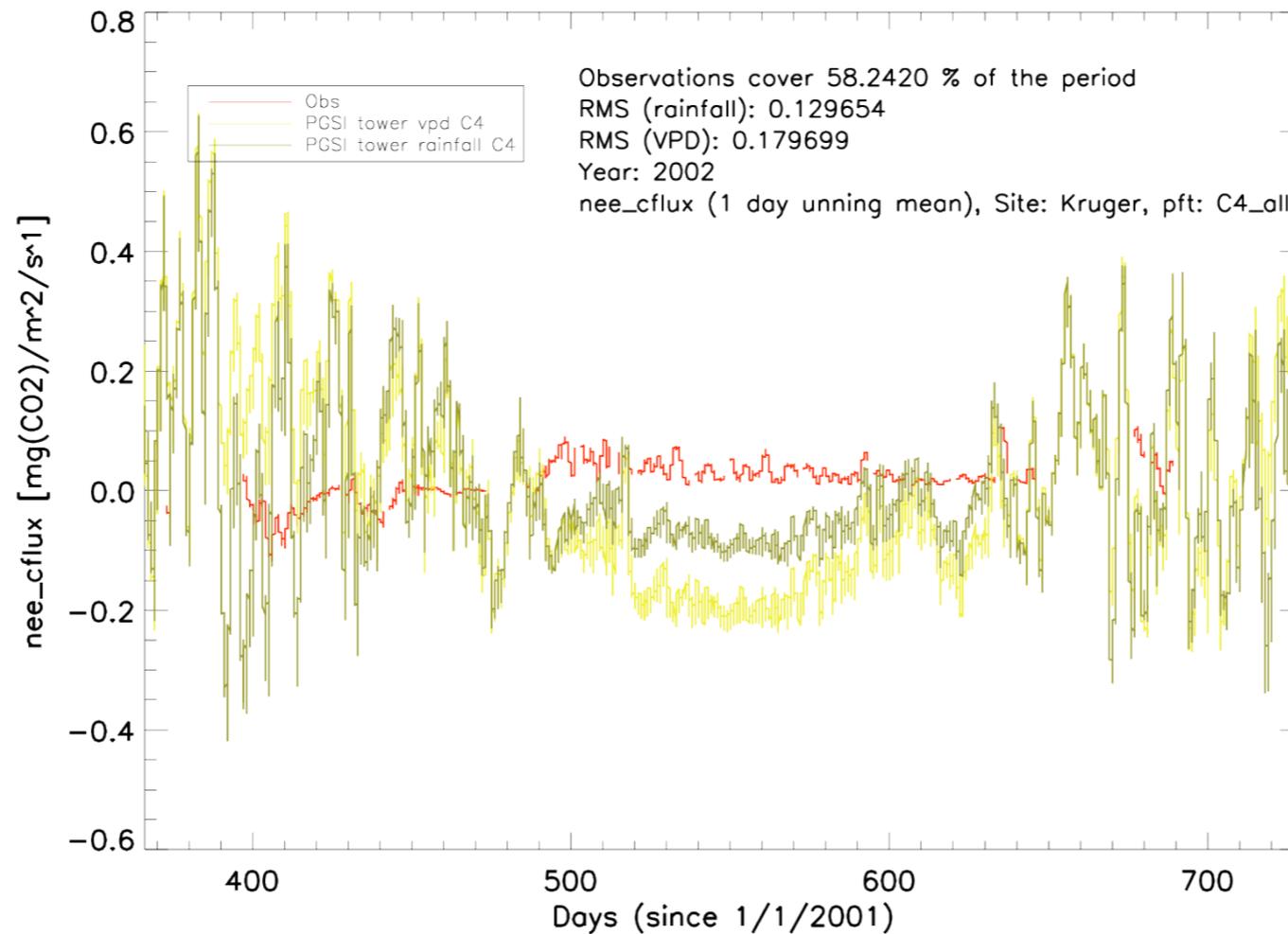


## 1. Ned Patton: New turbulent

- exchange parameterization.
- Demonstrated only for deep canopies (forest), not implemented in short canopies such as grassland
  - a. changes exchange magnitude
  - b. leaves are cooler -> higher transpiration -> lower Bowen ratio
  - c. implications for carbon flux (not shown)
  - d. SCM runs upcoming, evaluate influence on PBL

# 1. Biljana Orescanin - Prognostic Phenology (PGSI)

- a. Previously, we used spectral data (NDVI, MODIS) to specify; future runs impossible
- b. Incompatibility/problems with carbon pools
- c. Prognostic phenology keys to meteorological parameters (temperature, radiation, moisture)
- d. Works well in mid- high-latitude vegetation types, problems in grasslands
- e. Bilja is modifying PGSI to perform in grassland/savanna
  - i. Use rainfall/soil moisture rather than VPD
  - ii. Include a 'drying coefficient'
  - iii. Significant differences between C3/C4
  - iv. Evaluation metrics: fluxes, not leaf characteristics



# 1. Ian Baker - GPP constraint

a. Synthesis experiments reveal models have similar overall carbon flux, but GPP differs by factor of 2

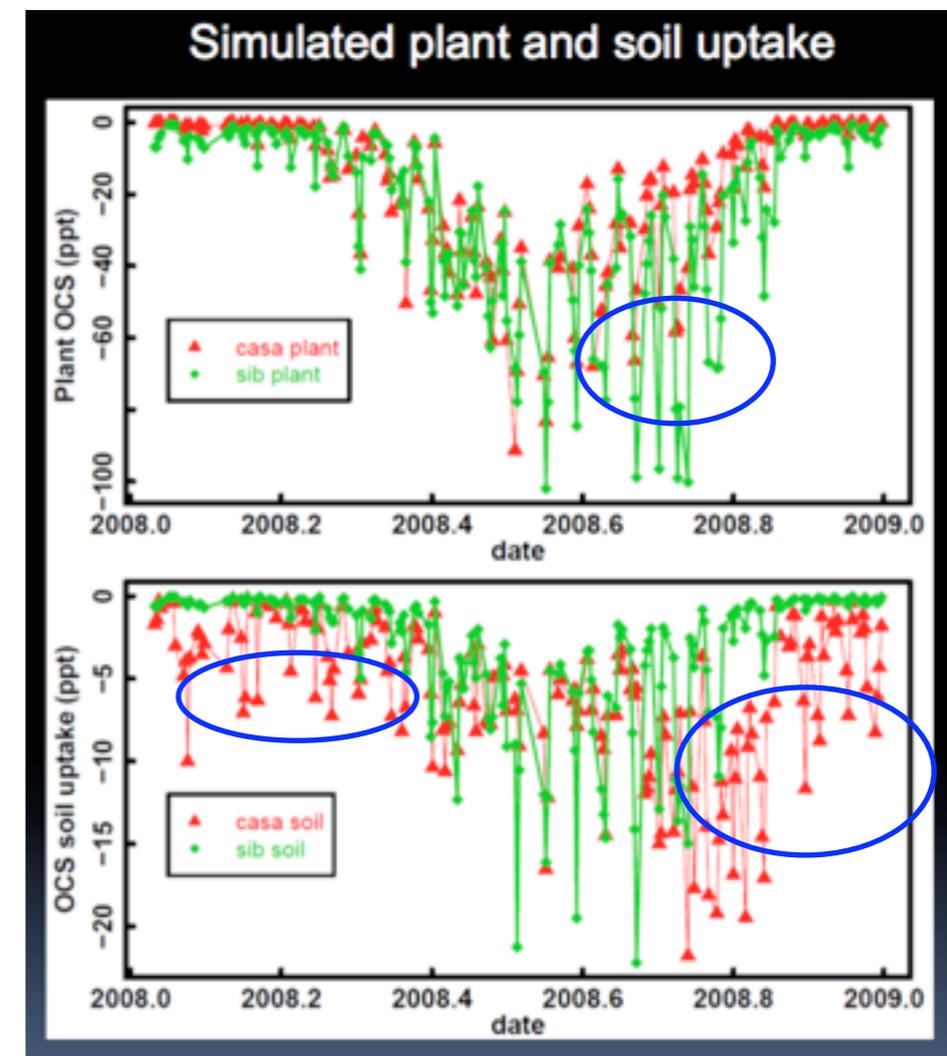
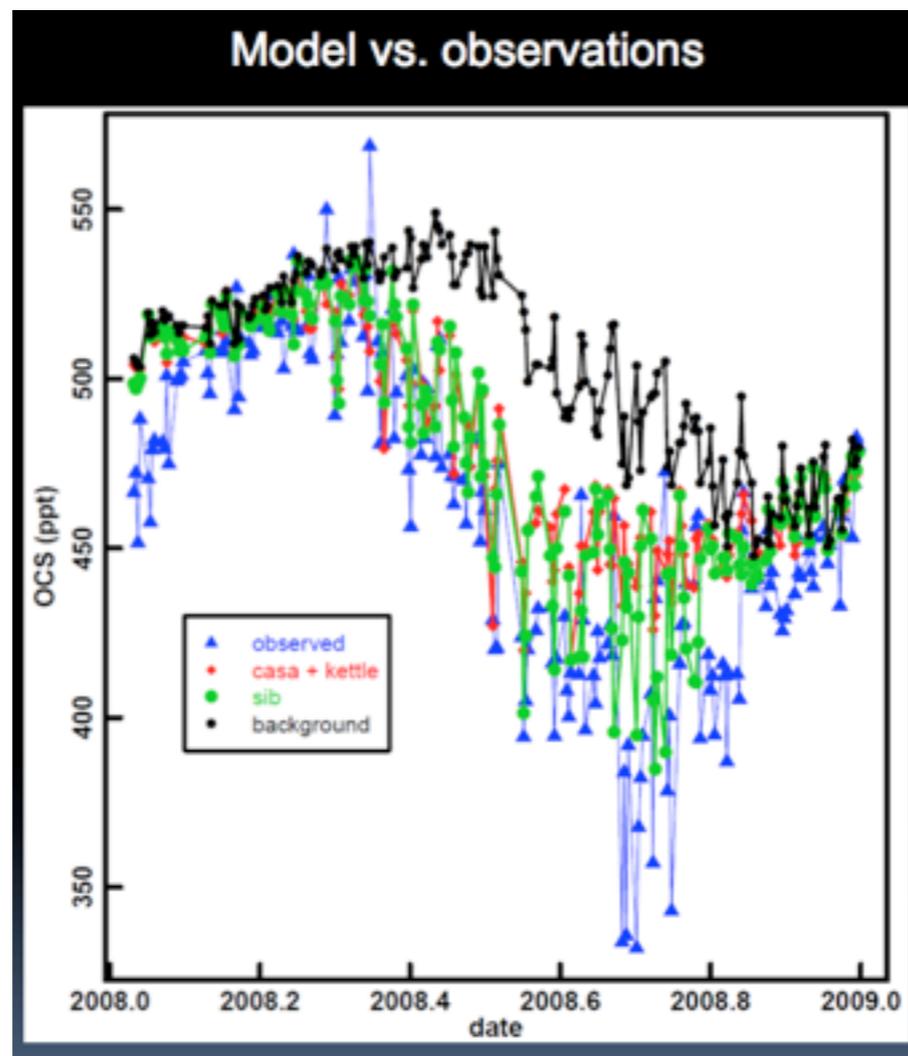
b. Carbonyl Sulfide (OCS)

i. CO<sub>2</sub> analog

ii. assumption: oceanic source, terrestrial sink

iii. method to quantify simulated GPP

iv. problem: recent obs show possible soil source of OCS



# a. Fluorescence

Observed by satellite (GOSAT, ESA, OCO)  
 correlation with light-response models of GPP

Us: enzyme kinetic model; we simulate fluorescence, compare to satellite

## SiB3 results, Monthly-mean diagnostics

Frankenberg et al.,  
 2011

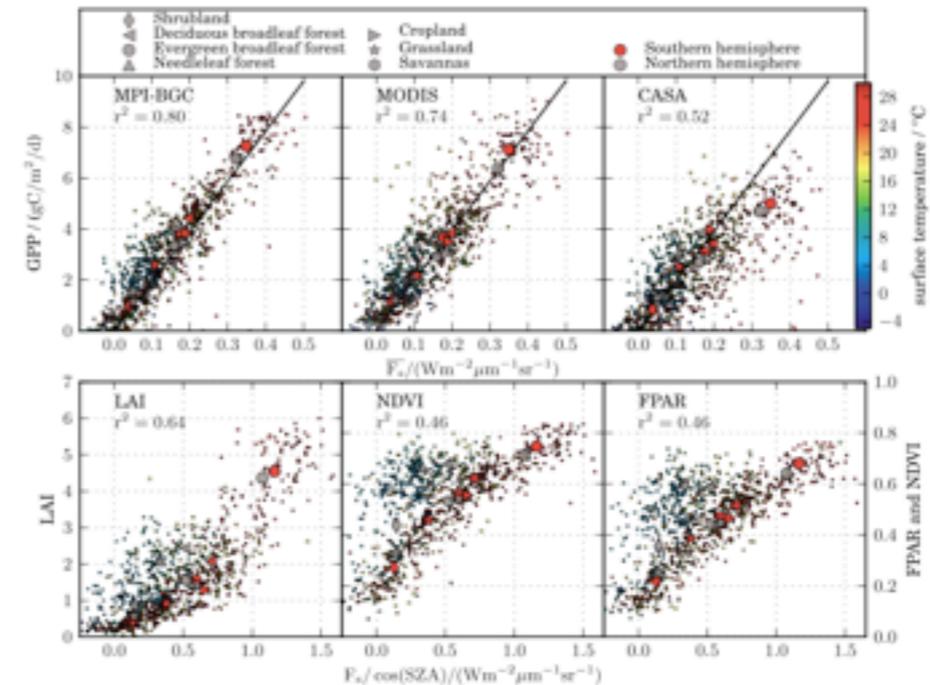
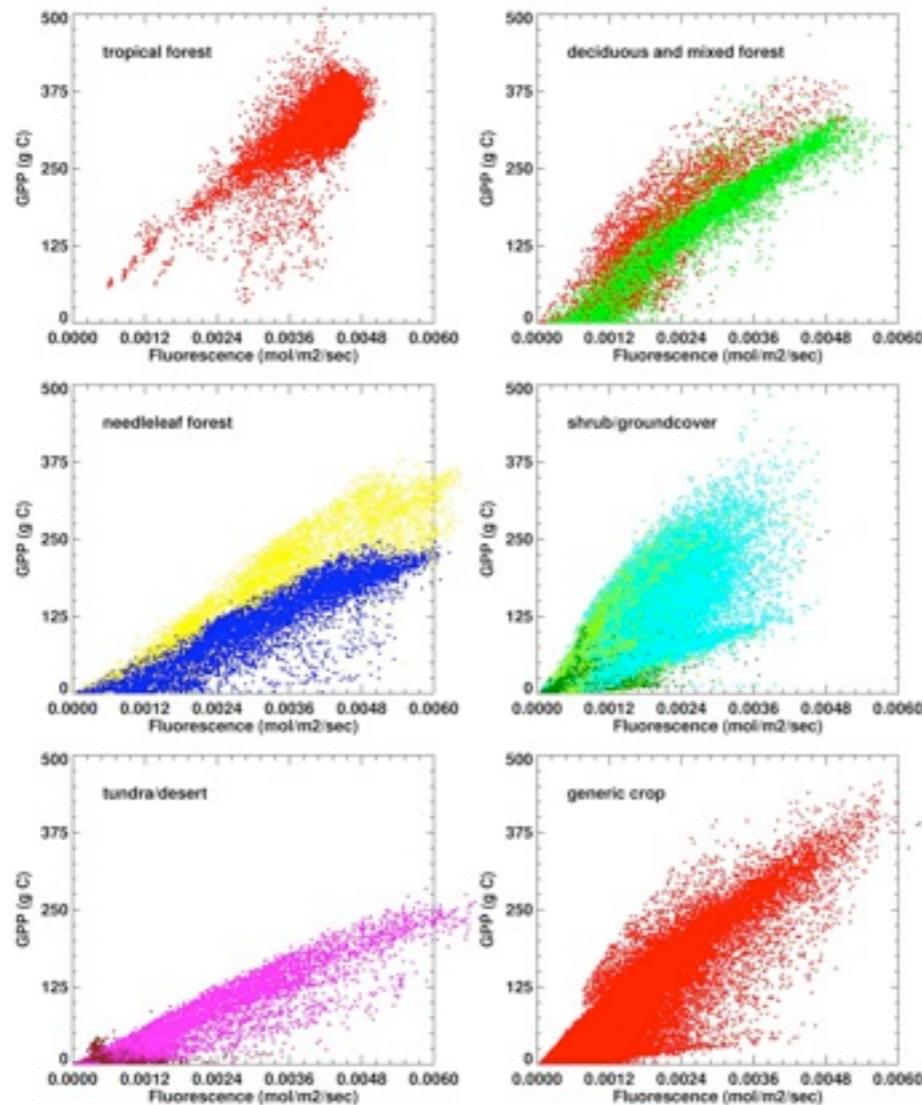
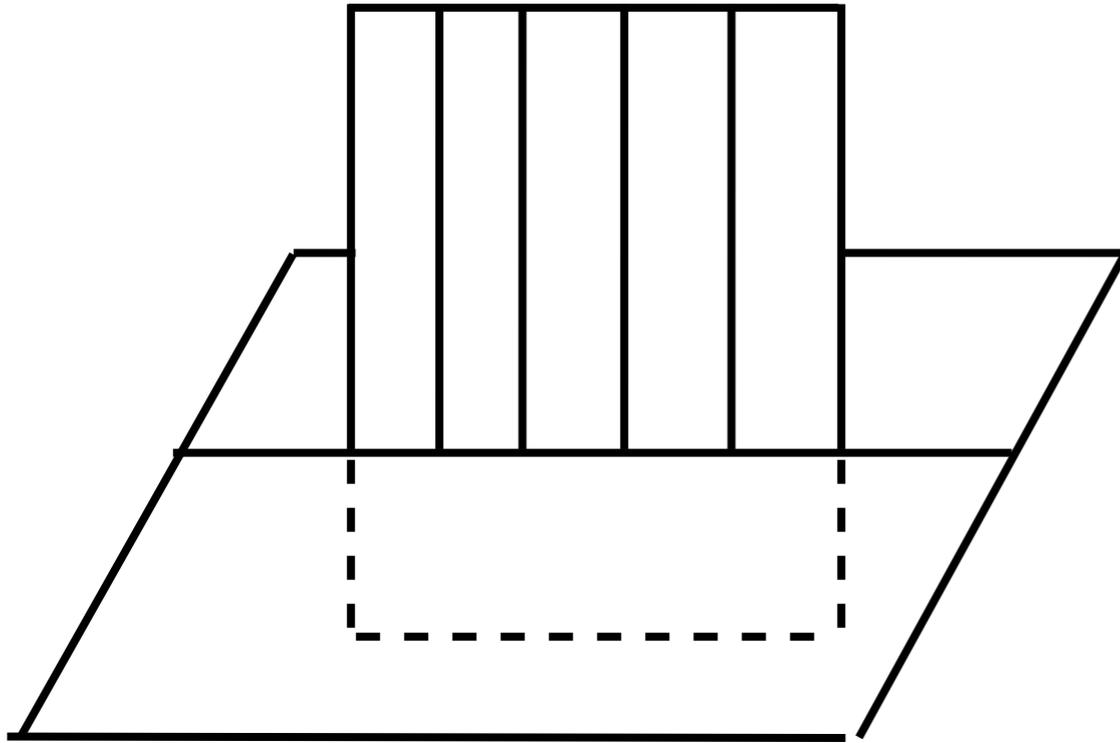


Figure 2. (top) Scatter-plot of  $4^\circ \times 4^\circ$  grid cell averages of fluorescence ( $F_s$ ) vs. GPP model estimates (small dots color-coded by latitude, only grid boxes over vegetated areas and with a  $1-\sigma$  precision error in  $F_s$  of  $<0.04 \text{ Wm}^{-2} \mu\text{m}^{-1} \text{sr}^{-1}$  are shown). The linear regression line in all panels equals a linear fit through the origin on the basis of the MPI-BGC GPP model. (bottom) Normalized  $F_s/\cos(\text{SZA})$  vs. MODIS LAI, NDVI and FPAR. The large symbols in all plots are biome averages, further separated for northern and southern hemisphere and based on  $1 \times 1^\circ$  biome classification see auxiliary material.

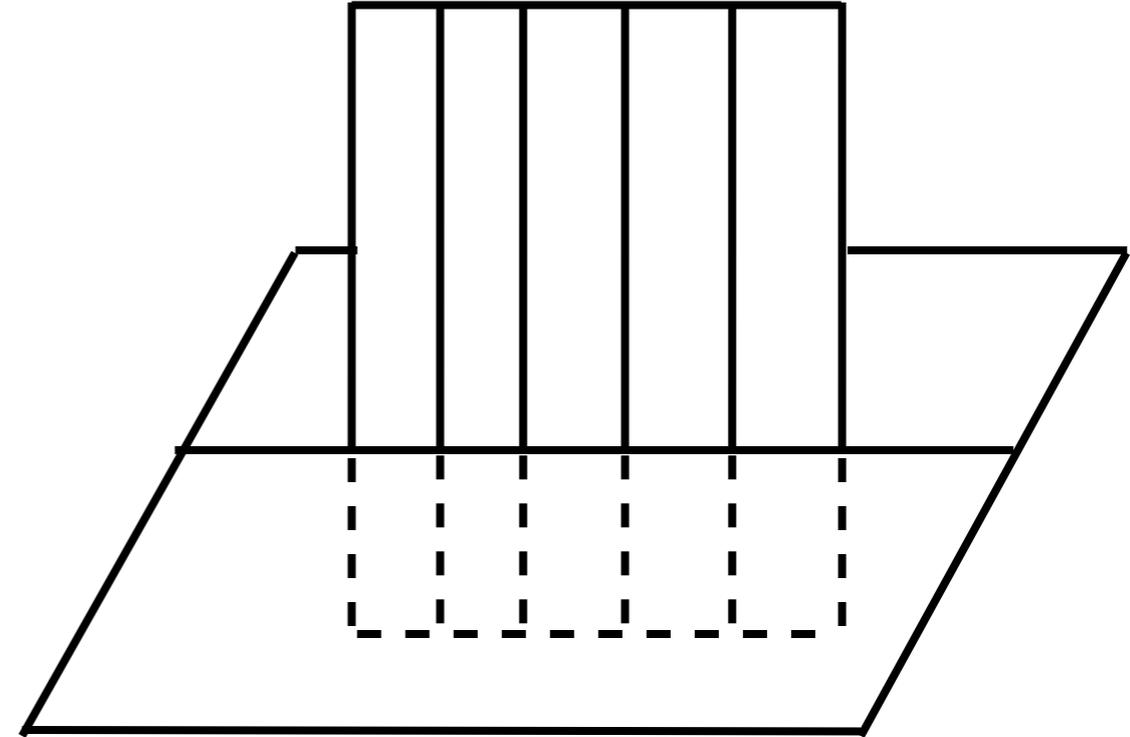
- Light-response vs Enzyme Kinetic
- Midday obs vs. monthly-mean

# CESM/CLM



**OLD**

- Distributed land in CESM
- What experiments do we want to run?



**NEW**