MC3E and GigaLES - Issues to resolve

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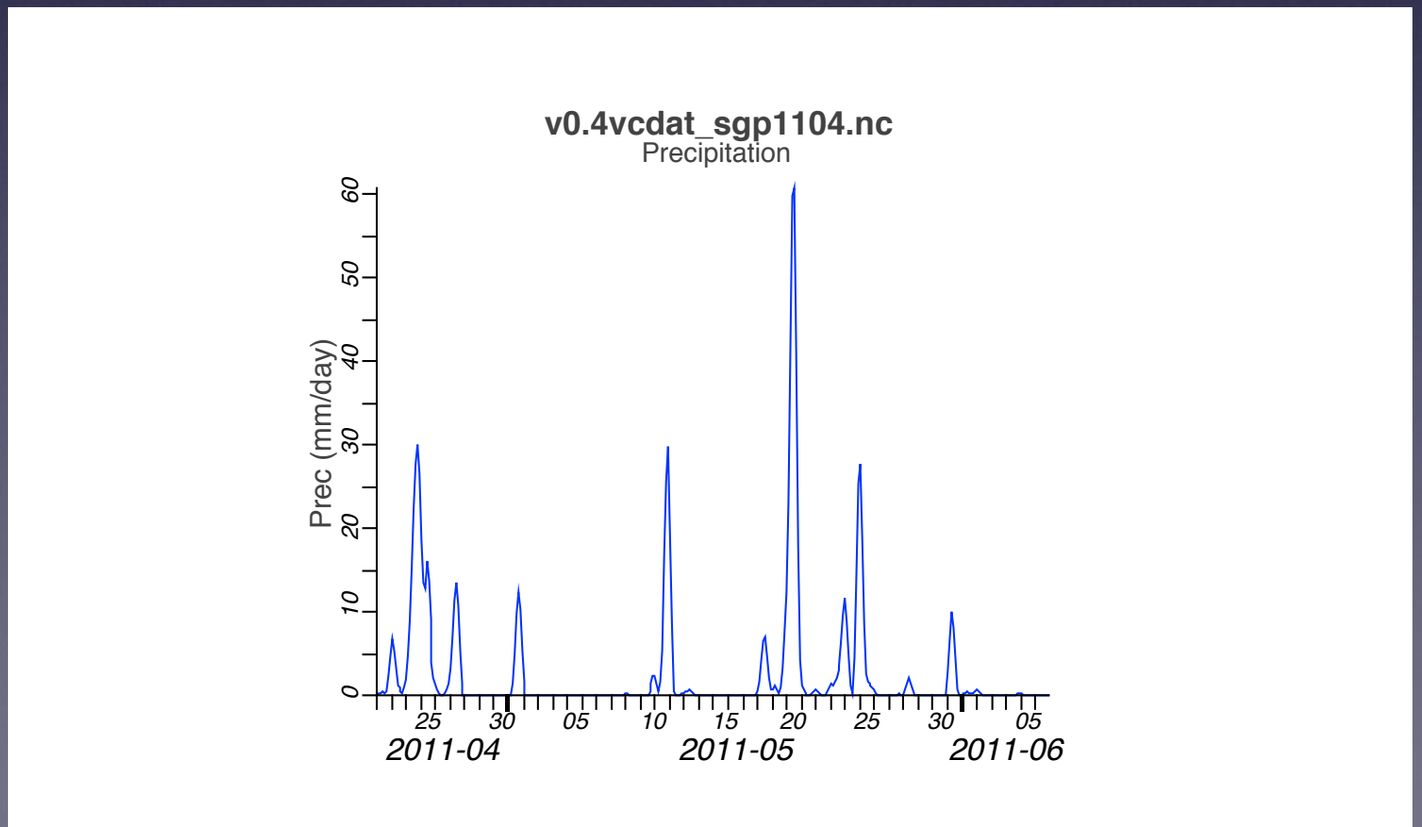
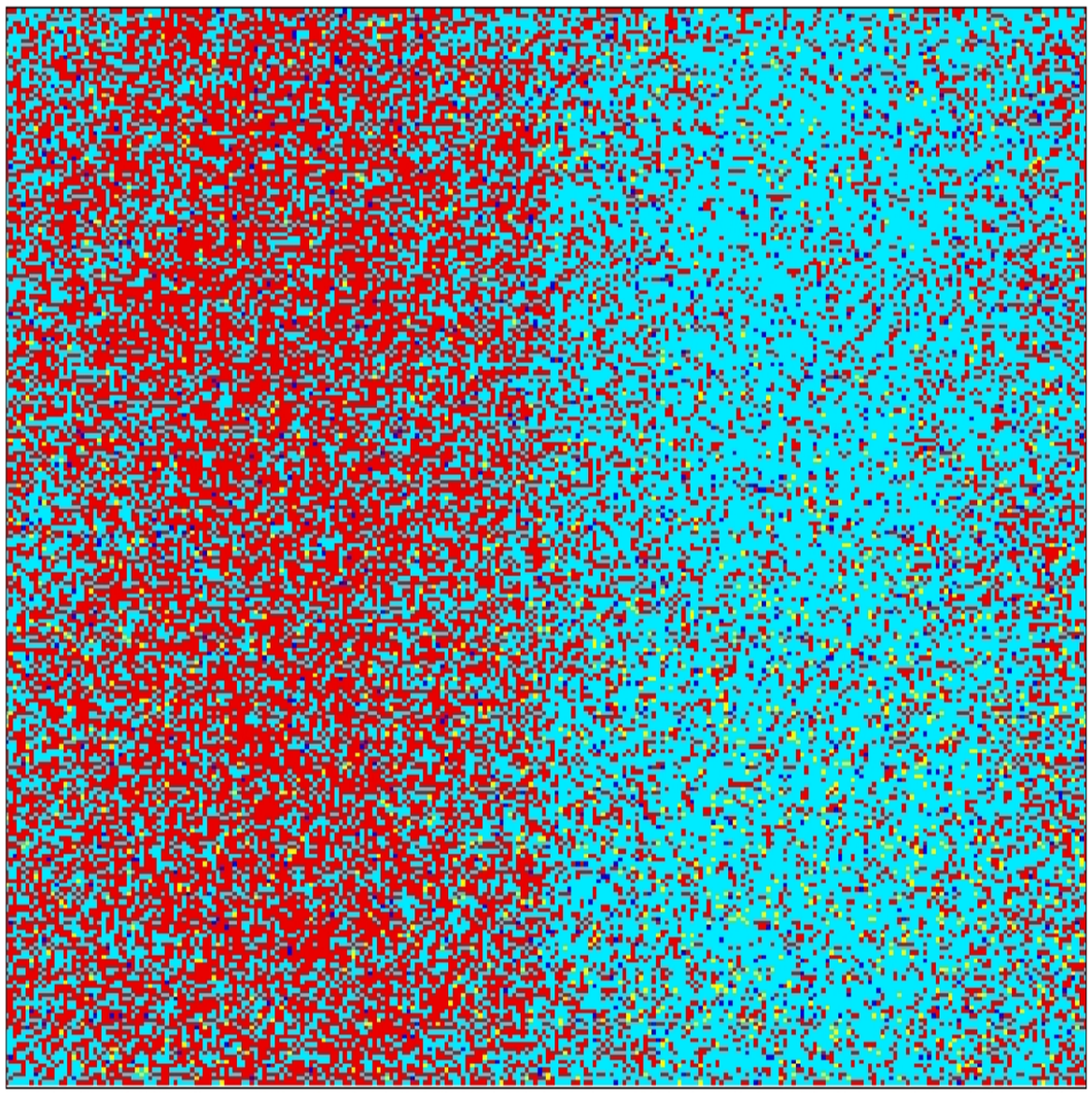
Land Surface Breakout

The Plan

- MC3E is 22 April 2011 through 06 June 2011
- The GigaLES target is the relatively unorganized convective event of 23 May. The simulation will start at 0600UTC 22 May and continue 3.5 days
- The GigaLES simulation will initialize SiB3 using a restart that will have spatial variability from an 800m simulation that starts 22 April. The 800m and 100m runs have the same footprint for the prescribed surface parameters.



Model Setup



- Model domain is about 2x2 degrees. Four 1x1 grid cells nearest SGP have had the soil moisture and temperature spun up for each of four biomes (2 grassland, forest, and crops) in an offline meteorologically-driven simulation up to 22 April, 2010.
- For each 1x1 cell the biomes are distributed randomly according to their observed frequency of occurence. 1x1 cell boundaries are also 'blurred' to remove sharp transitions.
- In all, any land cell has one of sixteen physiological parameters sets and initial conditions.

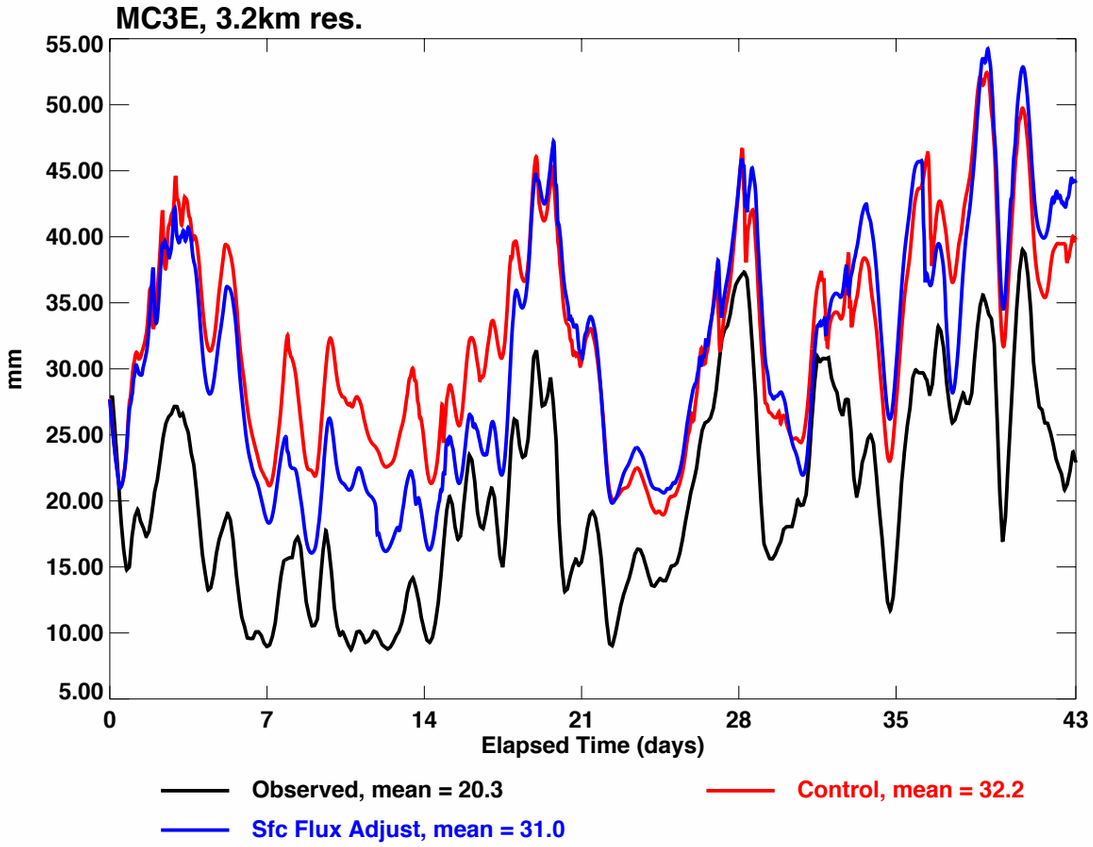
Forcing

- Observed horizontal advective tendencies of temperature and water vapor and vertical motion are available with 3-hourly frequency. These are applied uniformly across the model domain to provide the large scale forcing.

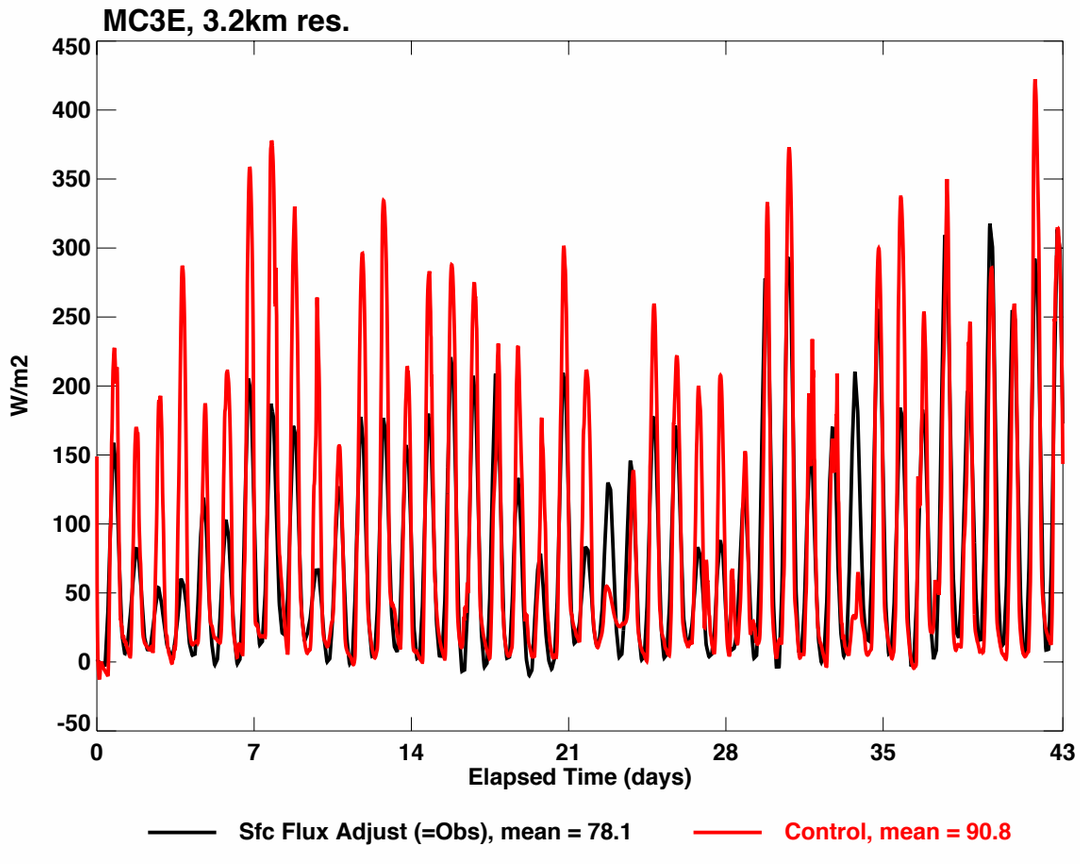
The Problem

- Experimenting with low (3.2km, 64L) resolution, coupled SAM/SiB3 showed warm and moist biases. This run is labeled 'Control'.
- As an experiment, the surface sensible and latent heat fluxes to the atmosphere were adjusted each timestep by a value such that their domain average equalled the observed. The fluxes into the land remain unadjusted. The spatial variability into the atmosphere remained unaltered.

Precipitable Water

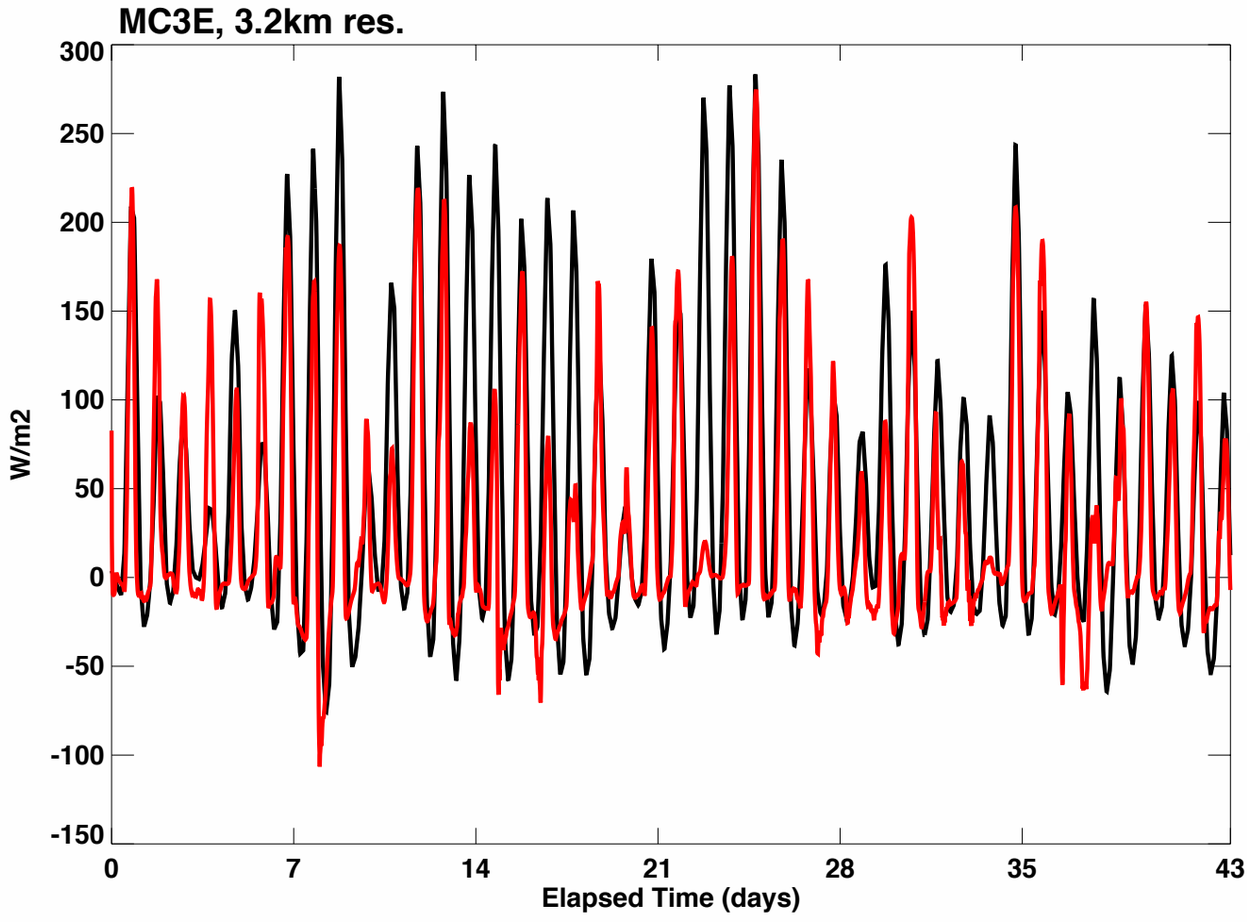


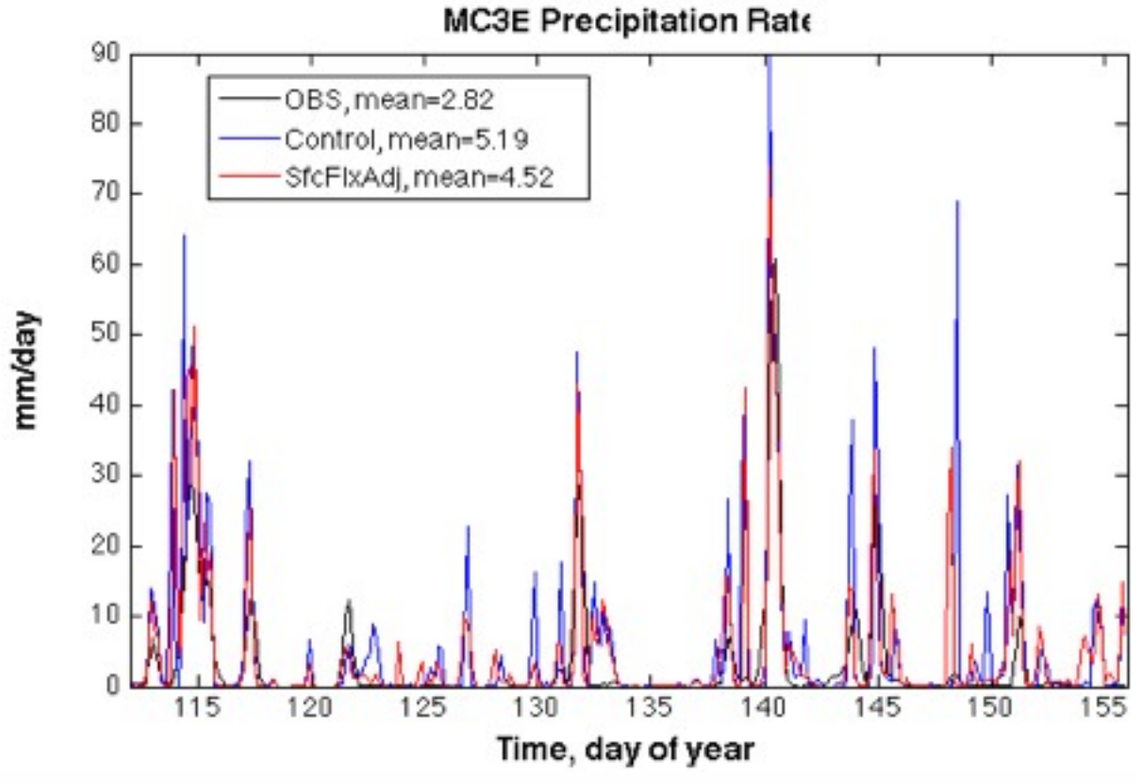
Latent Heat Flux

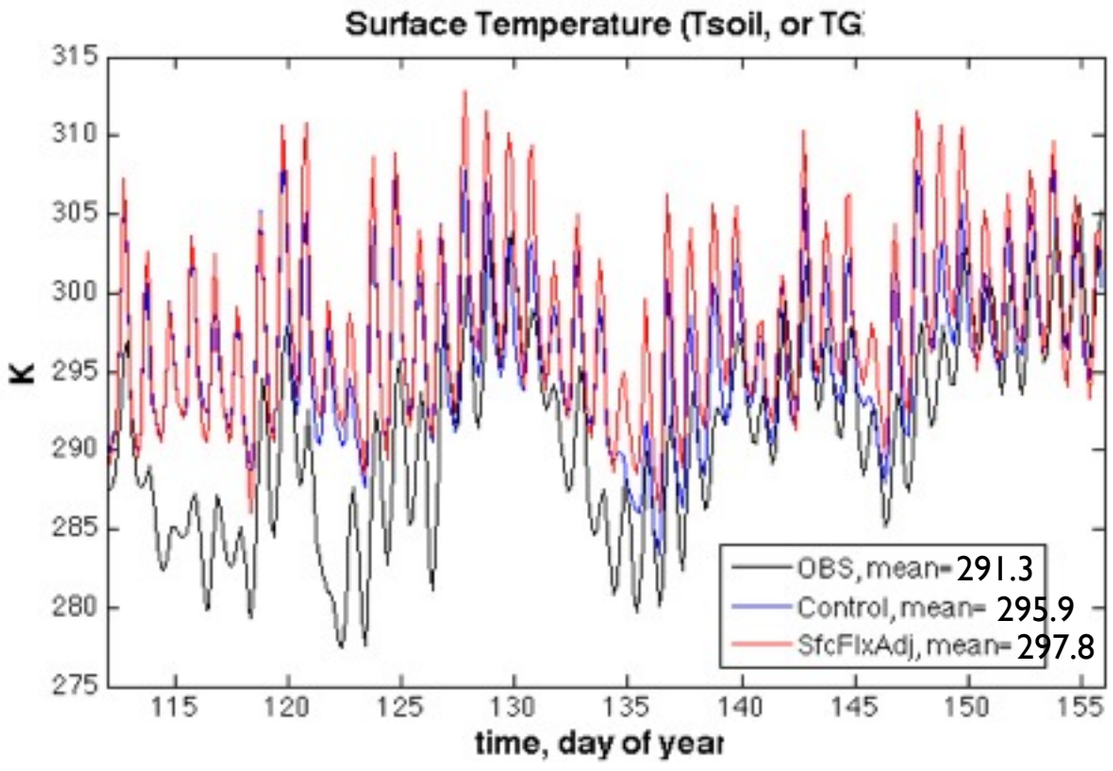


Energy

Sensible Heat Flux







Summary

- Have run coupled SAM/SiB3 at ARM-SGP for the MC3E at low (3.2km) resolution
- Warm and wet biases in the control run.
- Have a run where fluxes into atmosphere are adjusted to match obs. A little less wet, even warmer.
- A prescribed surface fluxes run (no SiB3) is also moist biased - precipitable water = 28.3 mm, total precipitation = 4.40 mm/day