- In my latest experiments, I turned on the simplified land model (SLM) which has interactive soil layers (2.5 m total depth) and physical parameterizations for canopy vegetation. Both the vegetation canopy and soil interact with the canopy air. The atmosphere is relaxed to prescribed atmospheric temperature and humidity profiles on a 4 hourly time scale.

- The soil composition, moisture and temperature profiles I applied are -

thickness[m],	soilt[K],	wetness,	SAND,	CLAY,	relax function
0.0100	300.1500000	0.6000000	17.0000000	13.0000000	0.0000000
0.0200	300.1374948	0.6030075	17.0000000	13.0000000	0.0000000
0.0400	300.1124843	0.6090226	17.0000000	13.0000000	0.0000000
0.0800	300.0624635	0.6210526	17.0000000	13.0000000	0.0000000
0.1600	299.9624217	0.6451128	17.0000000	13.0000000	0.0000000
0.3200	299.7623382	0.6932331	17.0000000	13.0000000	0.0000000
0.3700	299.4747182	0.7624060	17.0000000	13.0000000	0.0000000
0.5000	299.1120669	0.8496241	17.0000000	13.0000000	0.0000000
1.0000	298.4868060	1.0000000	17.0000000	13.0000000	1.0000000

- Radiation is explicitly calculated using CAM.

- 5 day simulation is performed for the month of August.

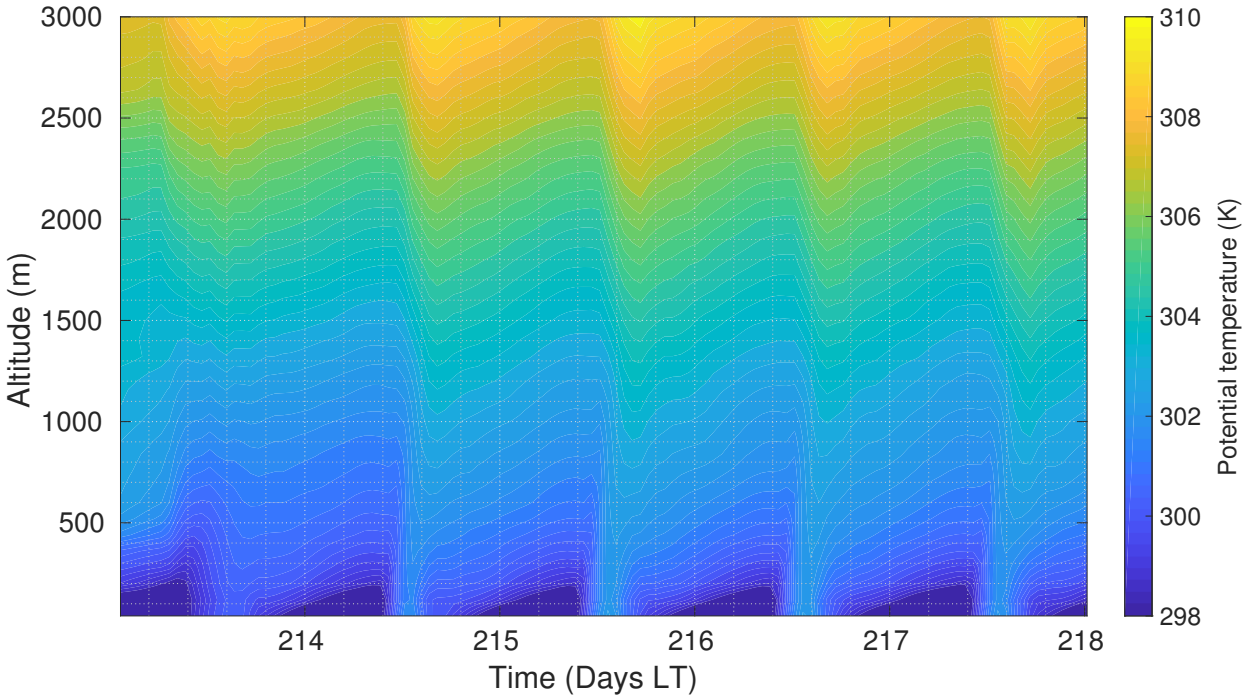
- These simulations took ~3 hours to simulate one model day.

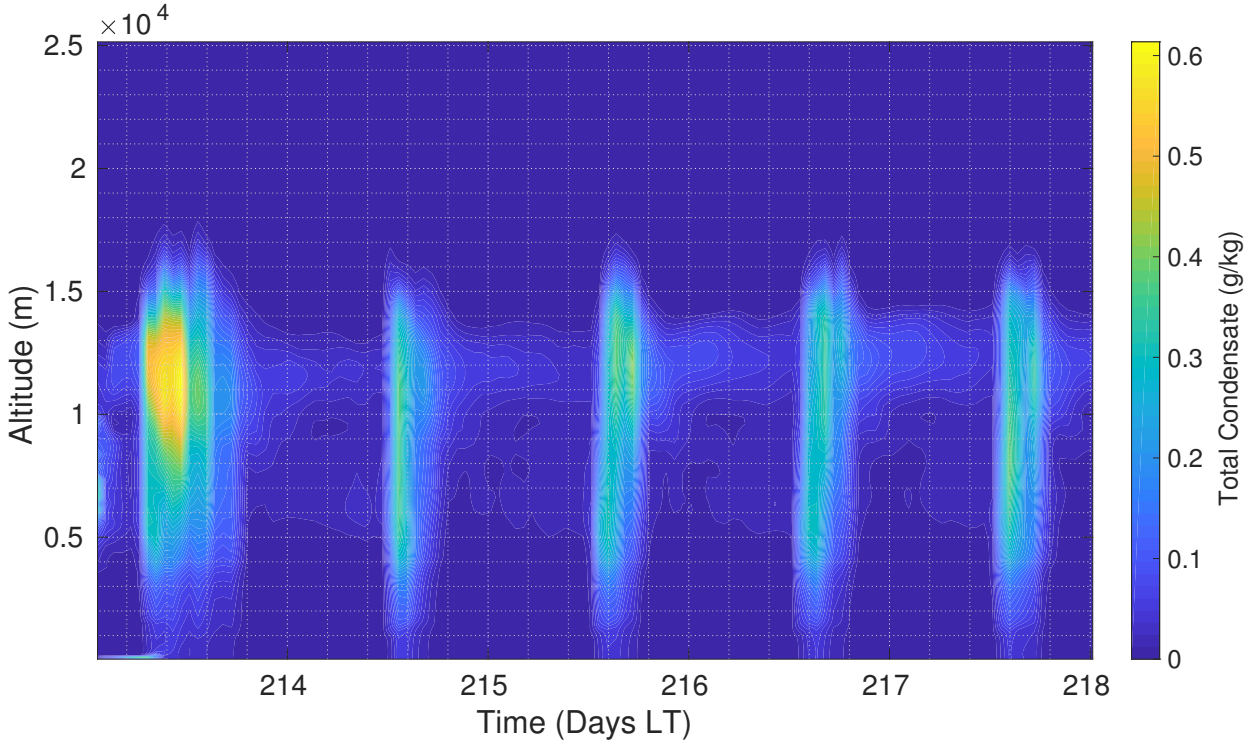
- I performed three experiments with different land cover, spatial location of domain and horizontal resolution.
- The first experiment with grassland vegetation used default SLM vegetation parameterizations which are not all representative of the Amazonian deforested vegetation. Although this experiment produced reasonable results I am not showing validation from this experiment as it used default parameters.
- The experiments with evergreen broadleaf vegetation were performed with customized parameters.

	location	spatial resolution	domain size	Land cover	LAI	Rooting depth	Minimum stomatal resistance	vegetation height	surface roughness
EXP1	Mancapuru	500m	100km by 150km	Grassland	3	1.5m (default)	170s/m (default)	50cm (default)	0.08
EXP2	Mancapuru	500m	100km by 150km	Evergreen broadleaf	7	2.2m	286s/m	30m	3.975
EXP3	Rondonia	1000m	200km by 300km	Evergreen broadleaf	7	2.2m	286s/m	30m	3.975

- A fog layer, which has been present in all experiments I have done previously (without using SLM), was absent in these simulations with SLM.
- I also performed a couple experiments with another simpler land surface model (probably bucket type) implemented in SAM. These simulations also did not have a spurious fog layer. This suggests that simultaneously prescribing surface fluxes with atmospheric temperature and humidity profiles resulted in the fog layer.

- I validate the simulations EXP2 and EXP3 using field data collected during the LBA campaign between February 1998 and September 2002. I compare the simulated and observed August diurnal cycles, monthly means and precipitation totals.
- EXP2 is compared with data collected at the forest site K-34 near Manaus.
- EXP3 is compared with data collected at the forest site Reserve Jaru in Rondonia.



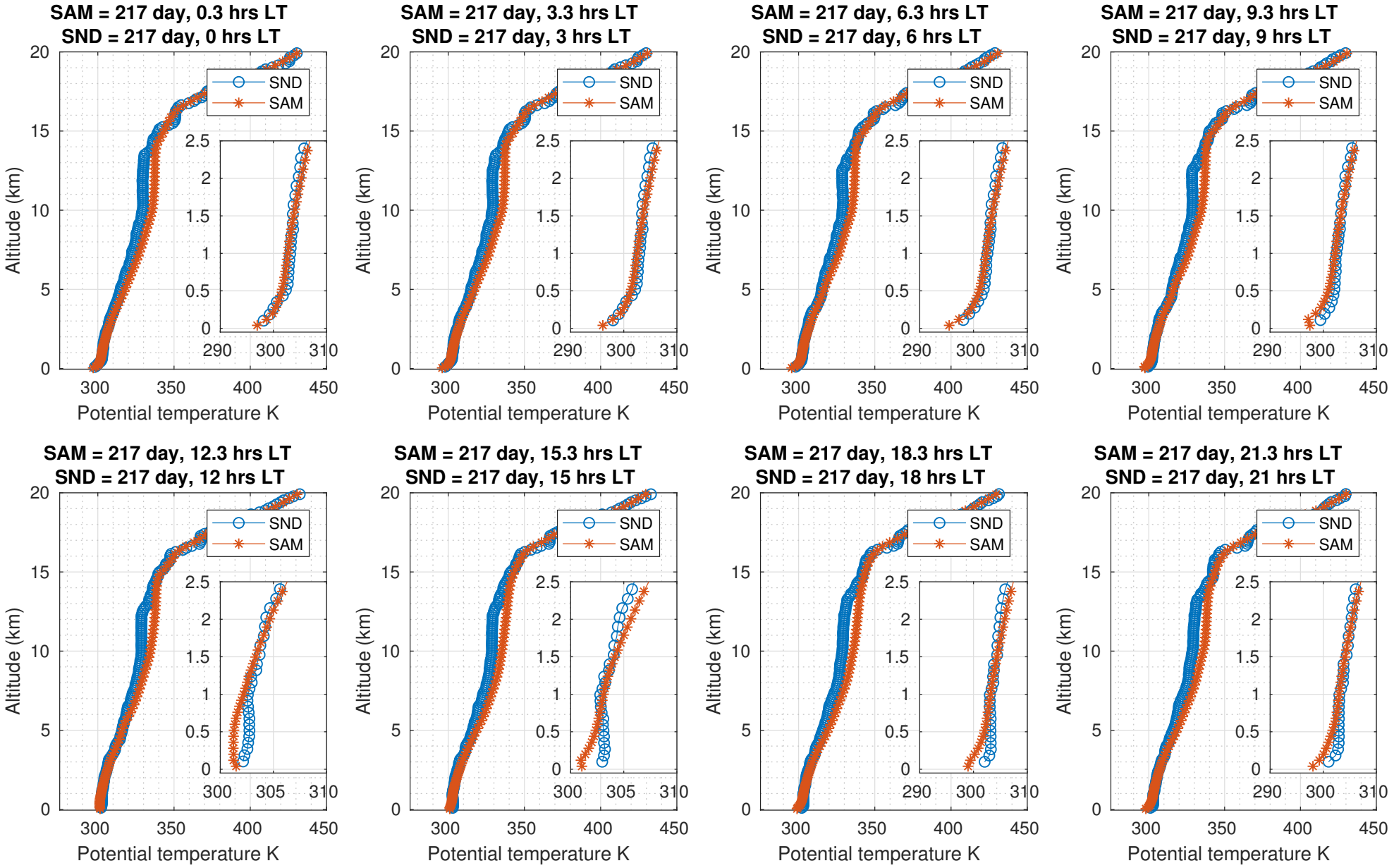


EXP2 - Manacapuru forest

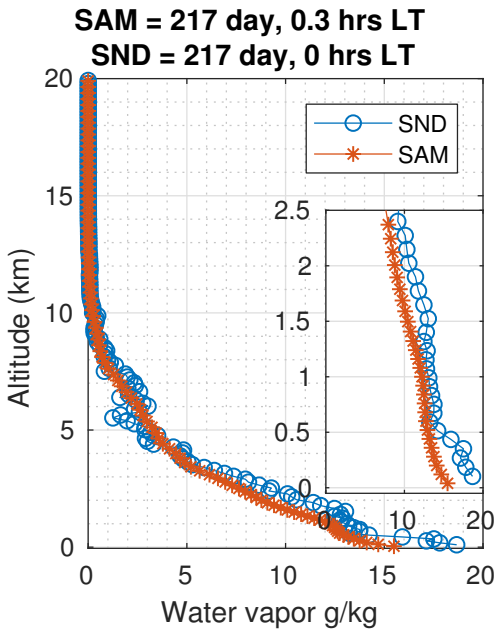
vertical profiles of potential temperature and total condensate

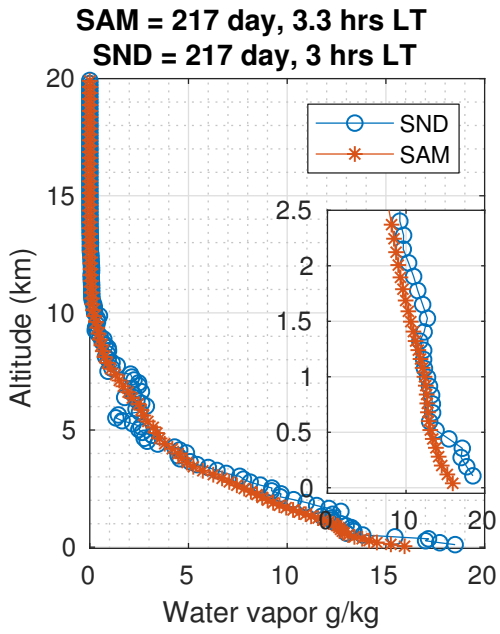
- no fog layer

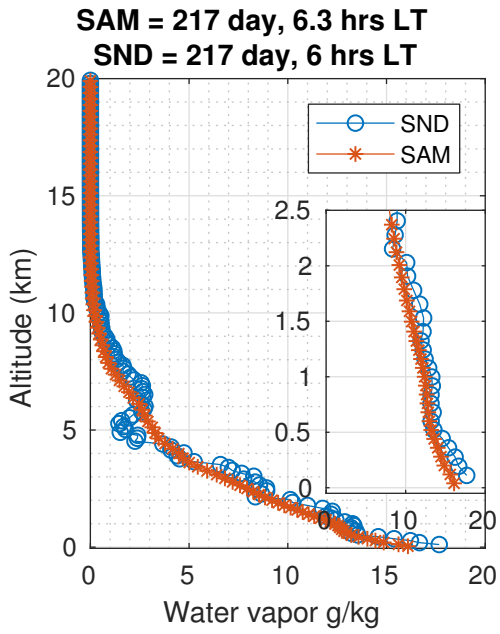
EXP2 - Manacapuru forest
area averaged vertical profiles of
potential temperature versus sounding data

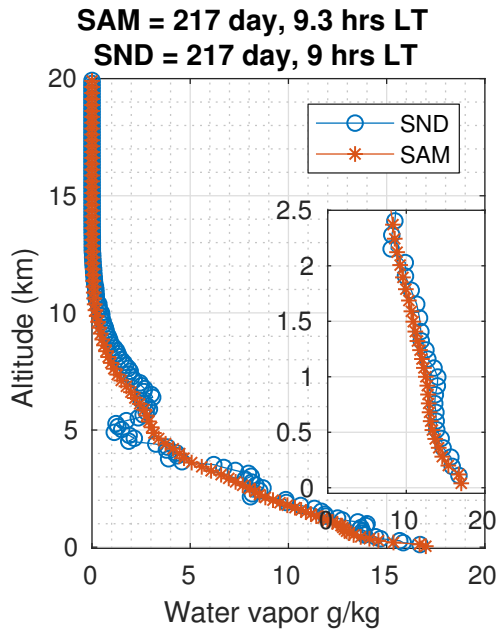


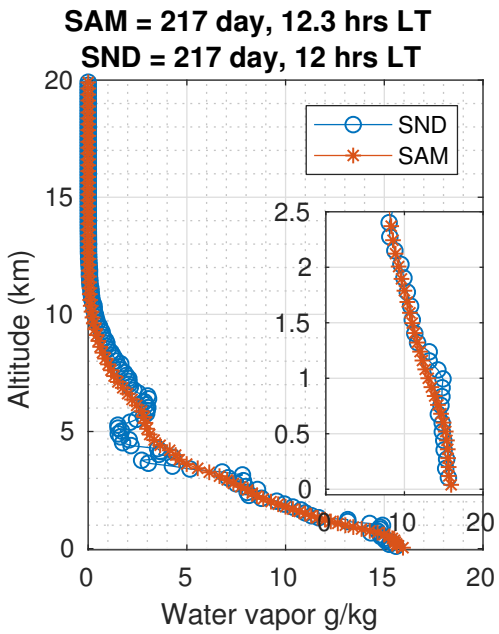
EXP2 - Manacapuru forest area averaged vertical profiles of specific humidity versus sounding data

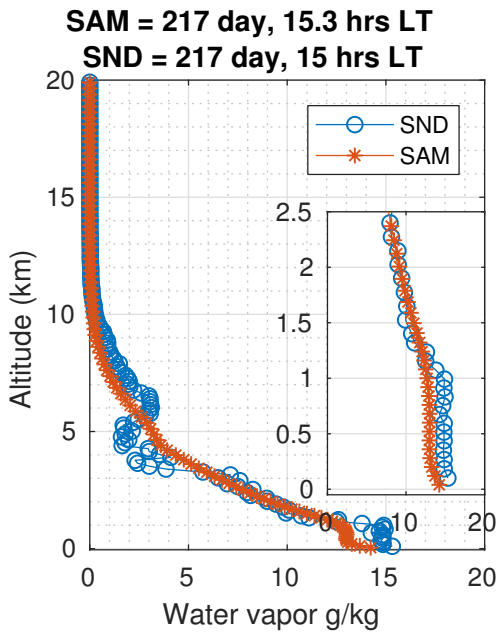


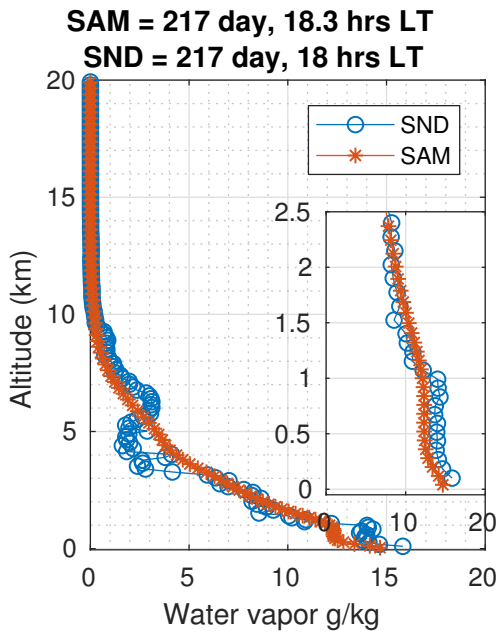


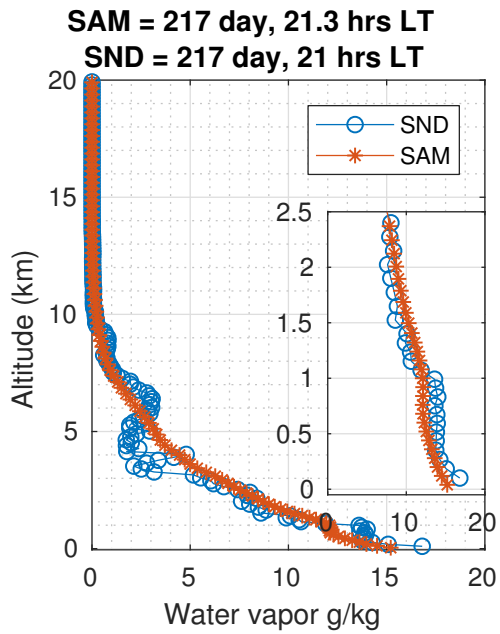




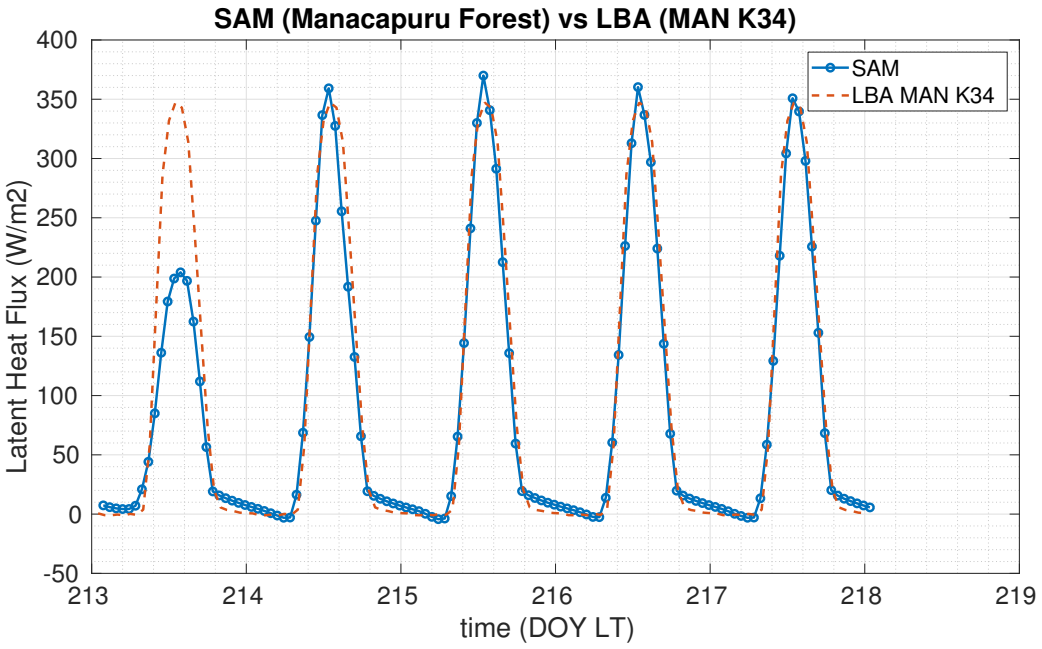


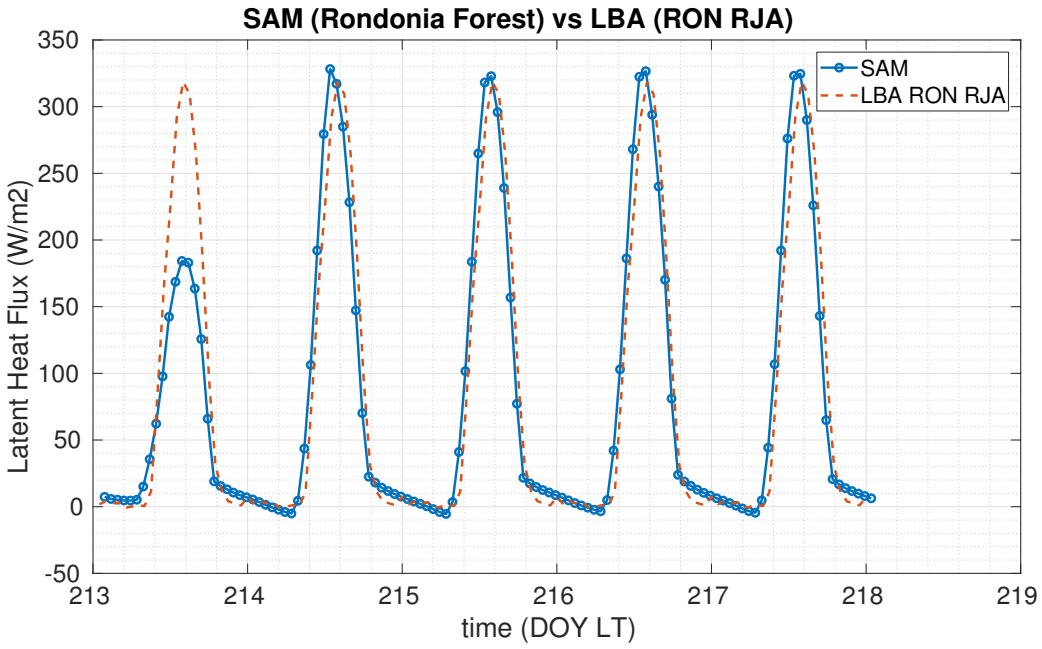


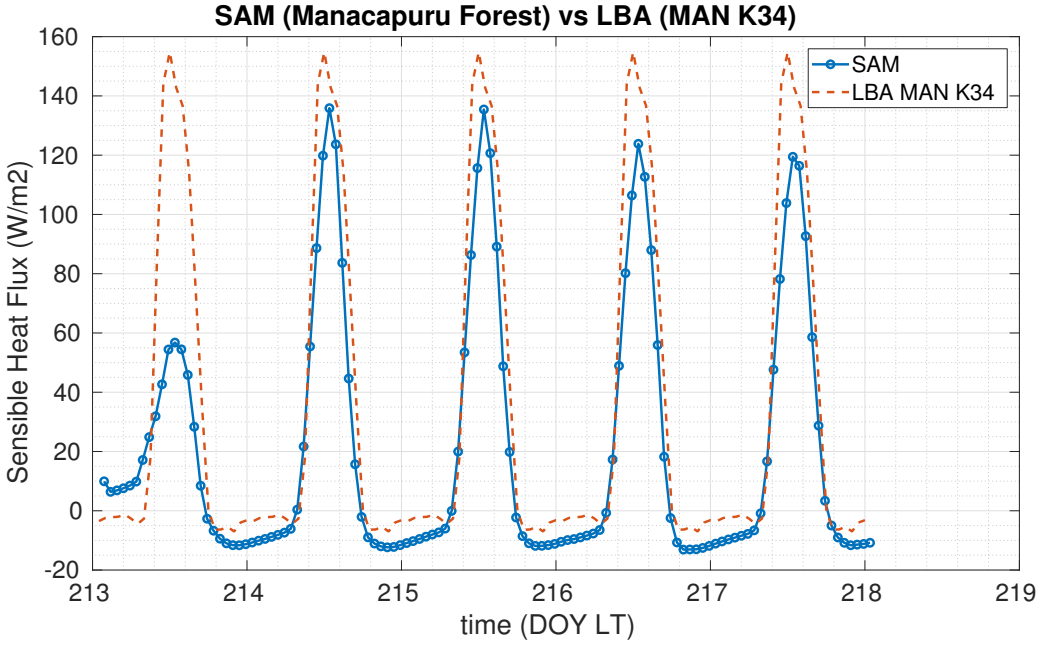


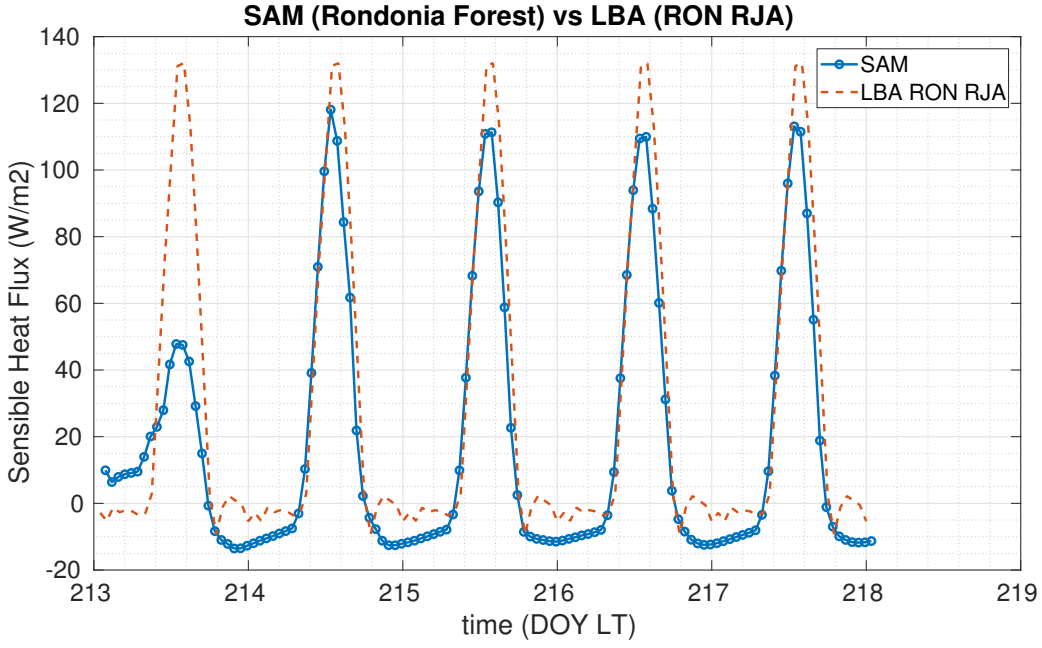


surface latent and sensible heat fluxes

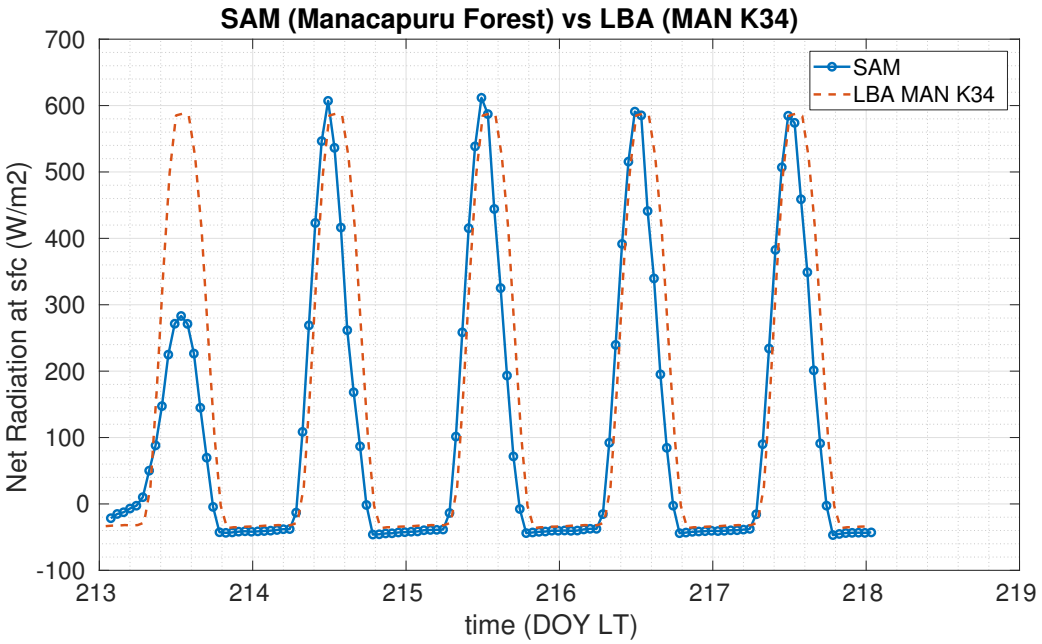


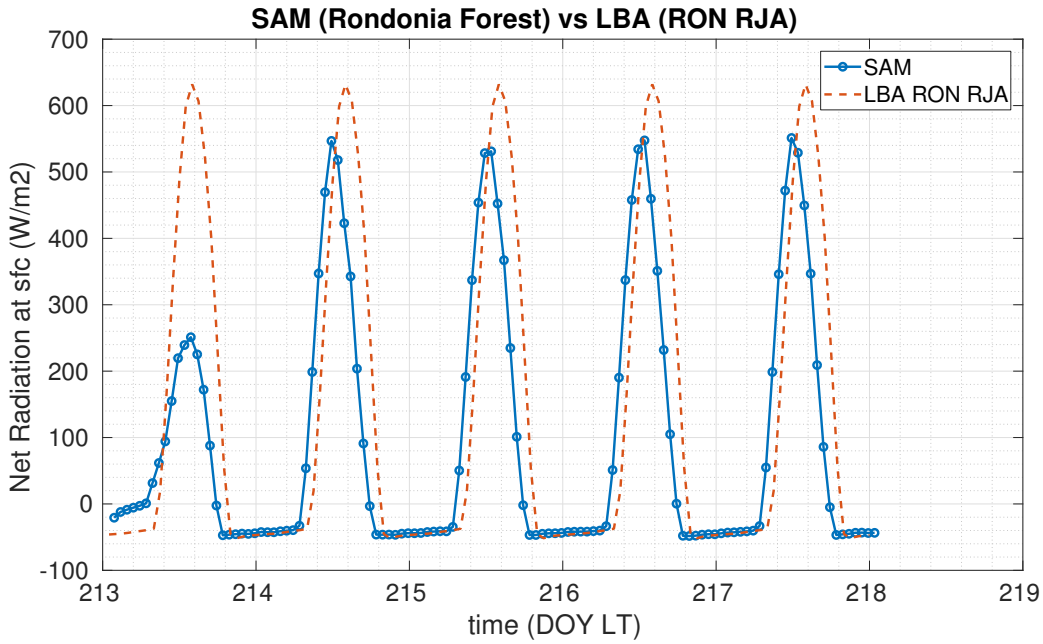






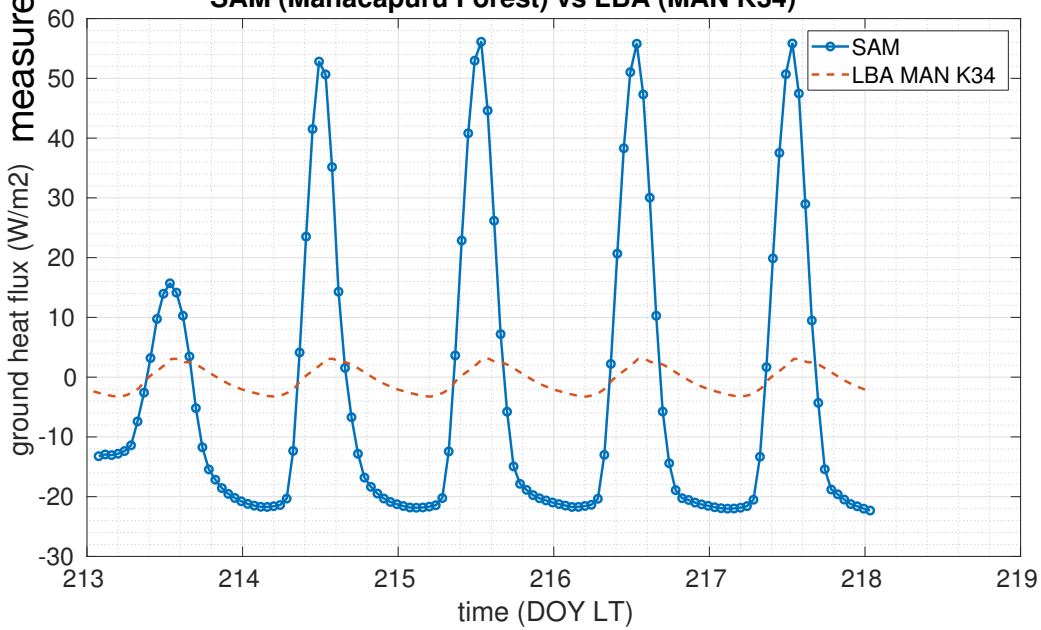
surface net radiation

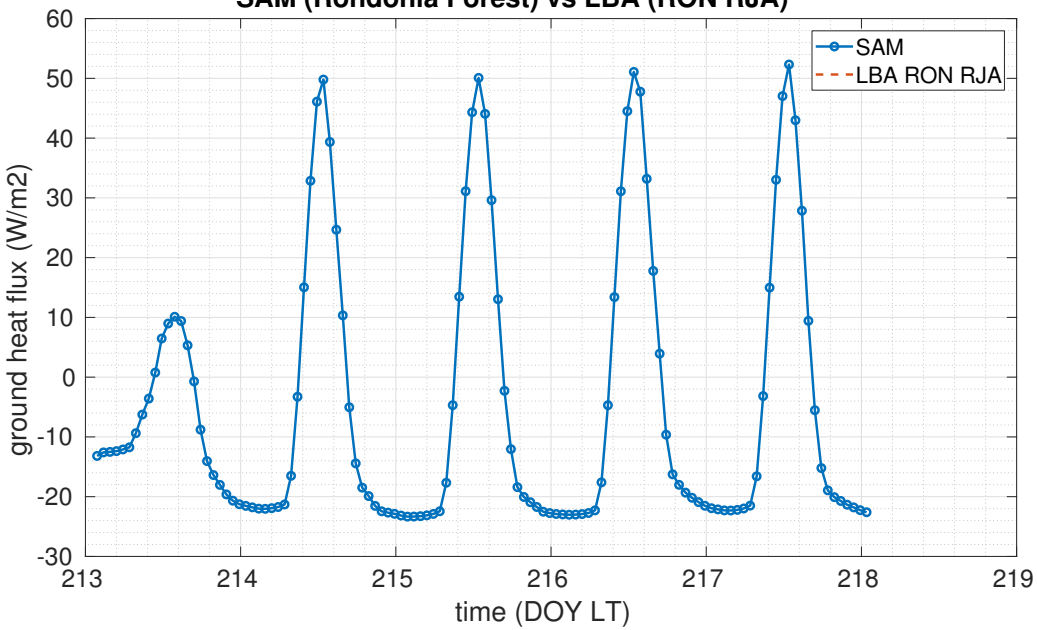




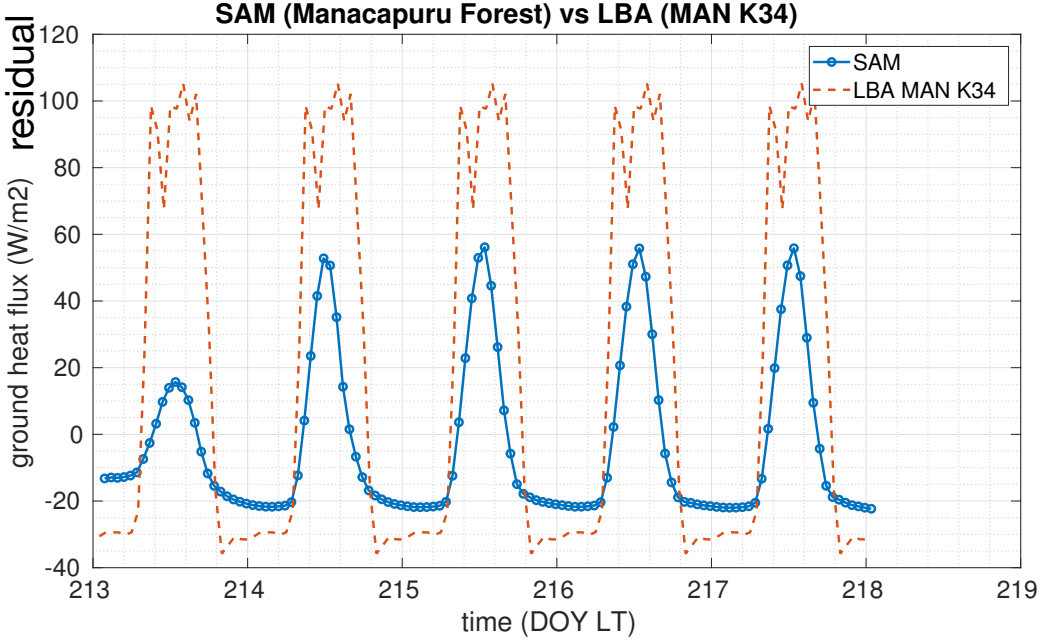
ground heat flux measured and residual from measured Rn, LH and SH versus simulated ground heat flux

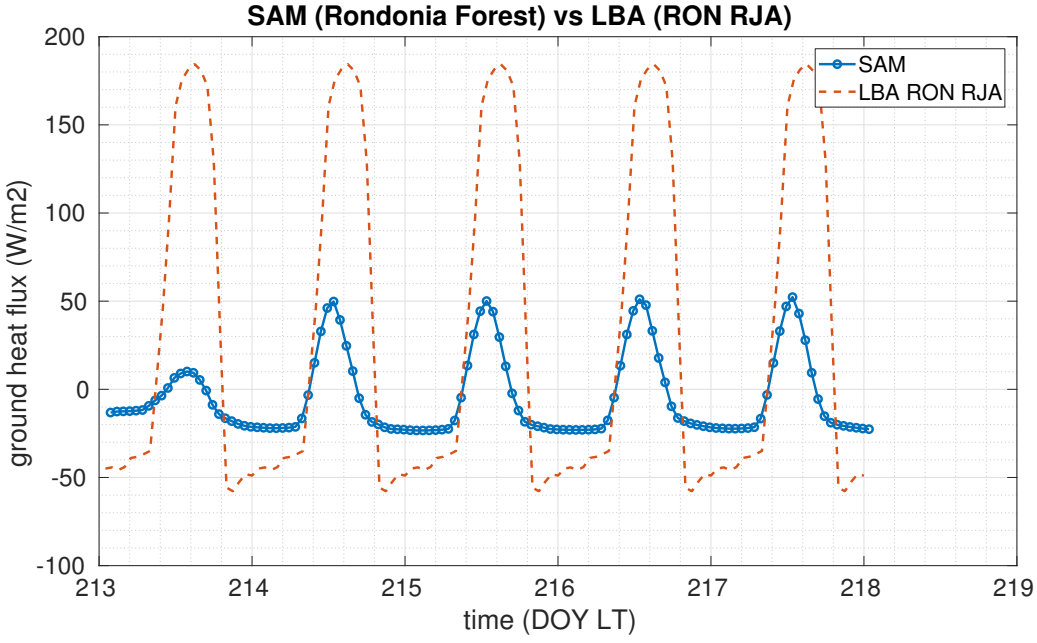
measured



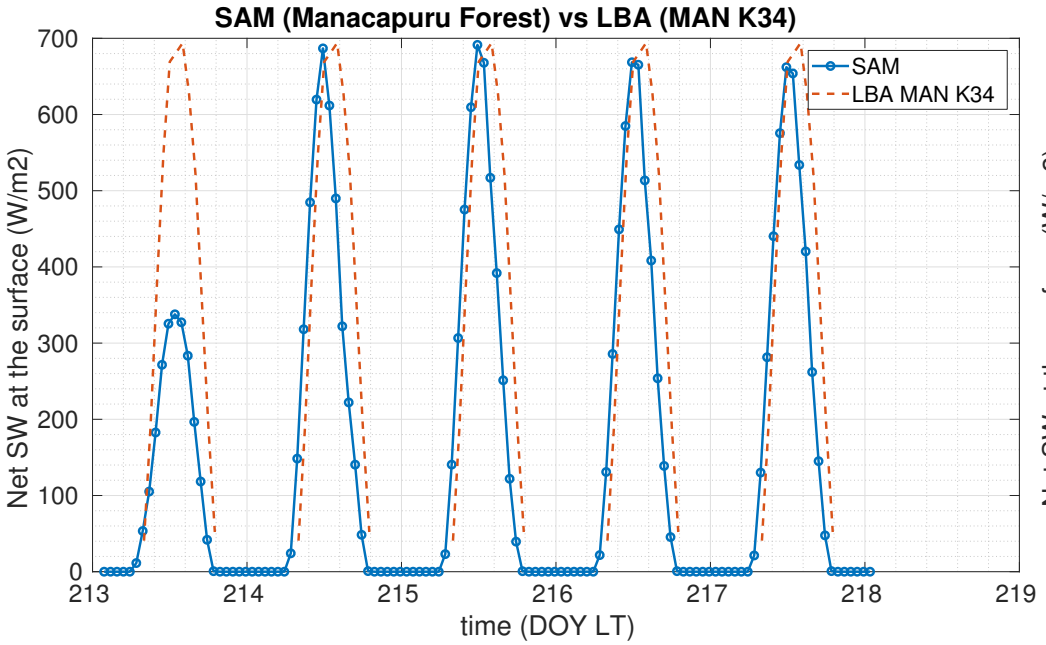


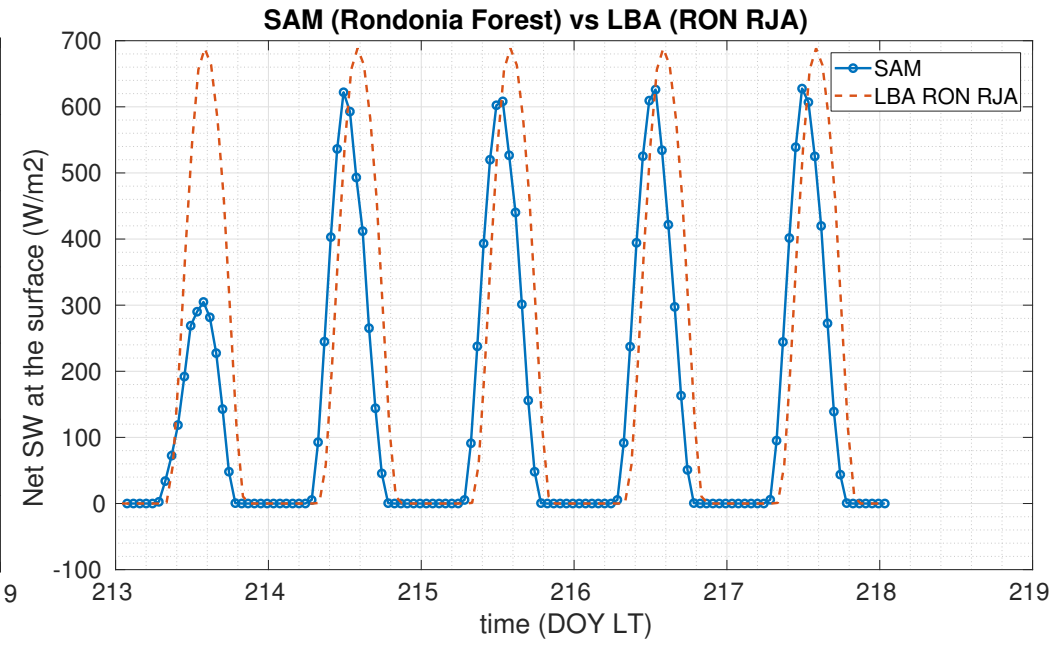
residual

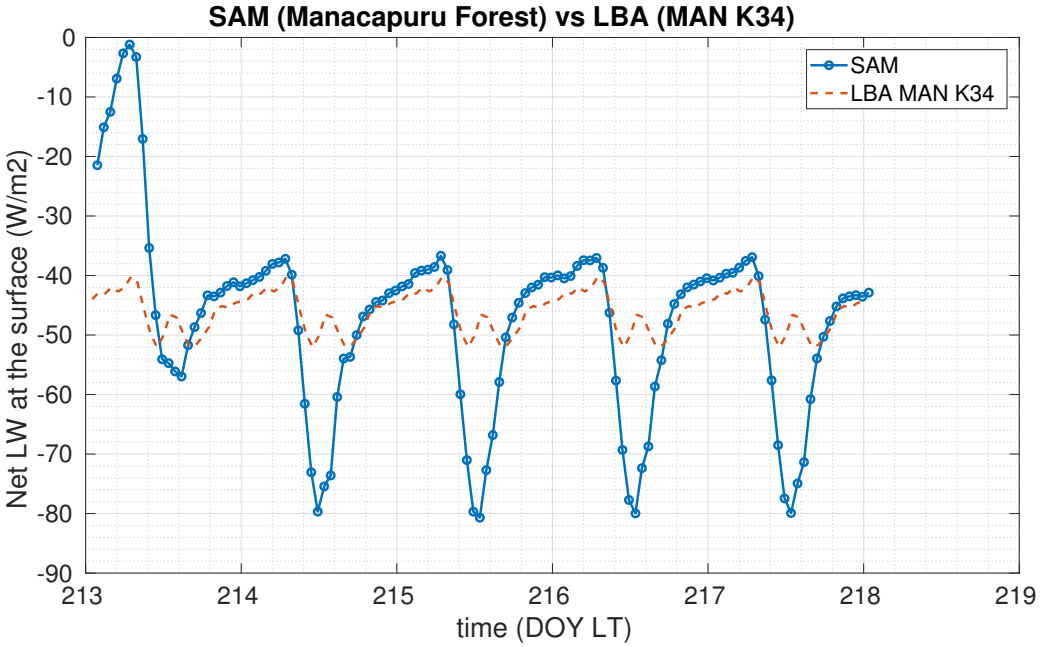


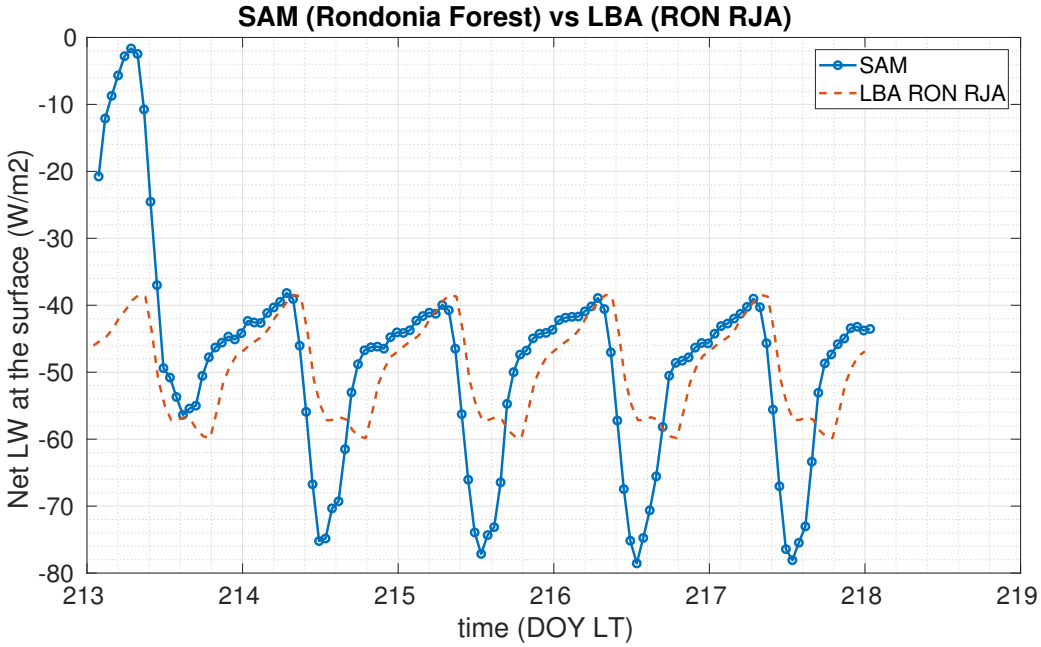


net short wave and long wave at surface

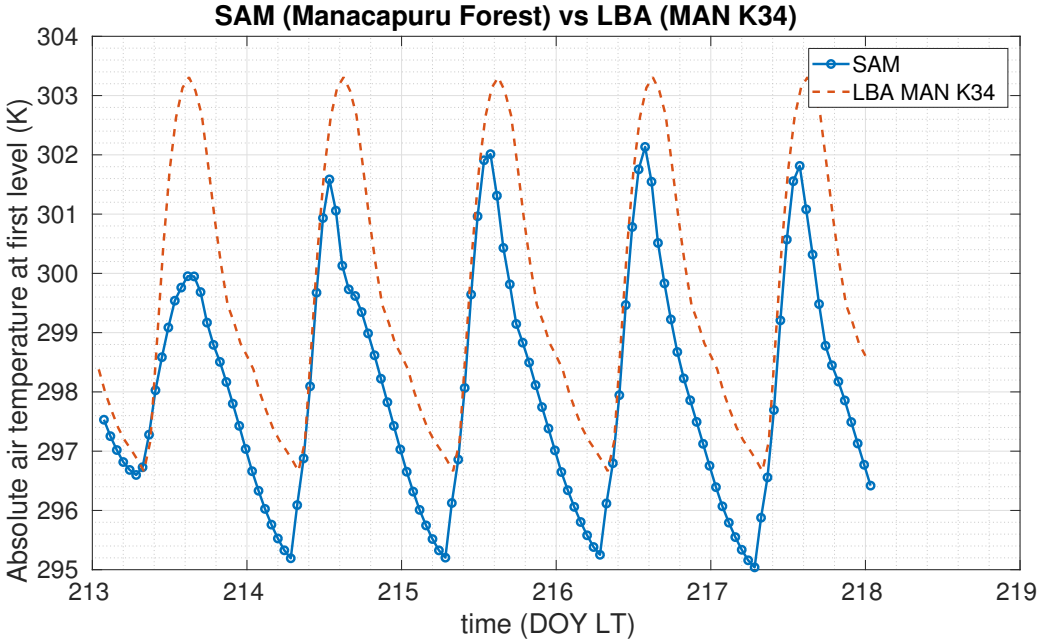


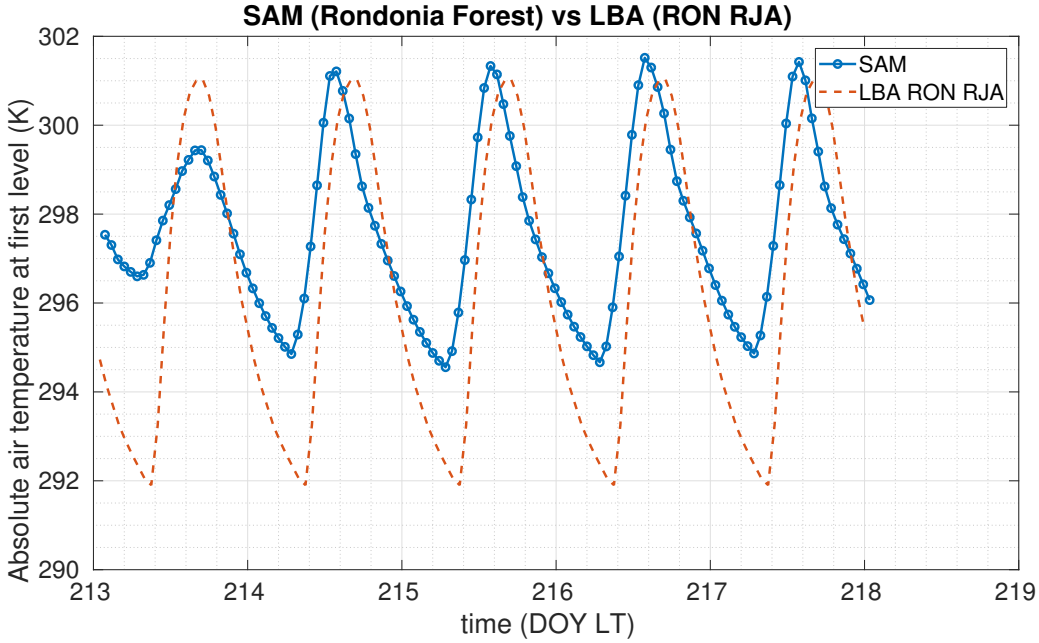


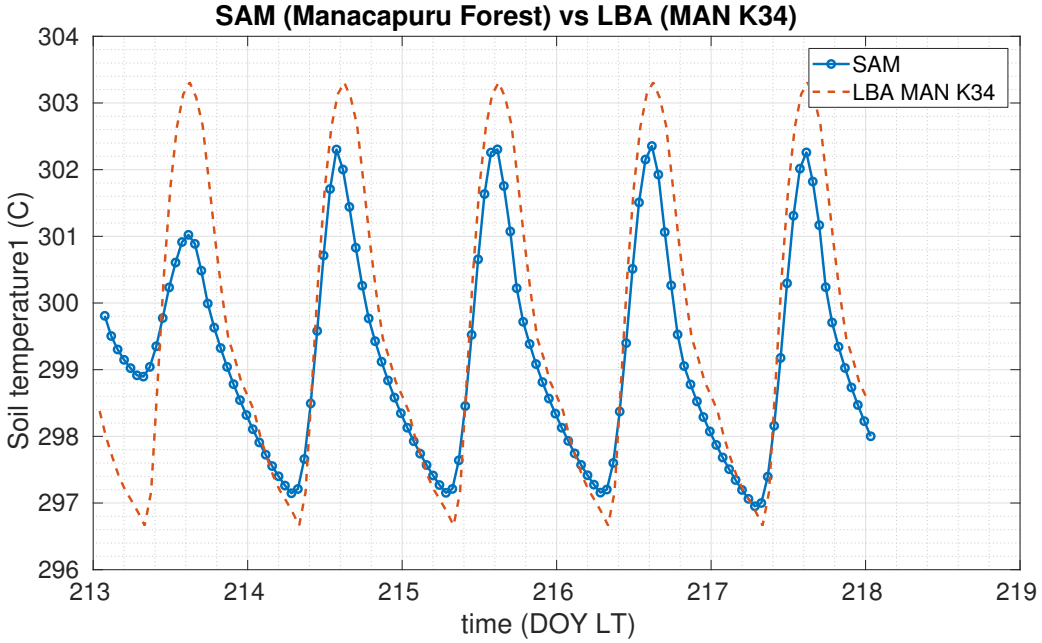


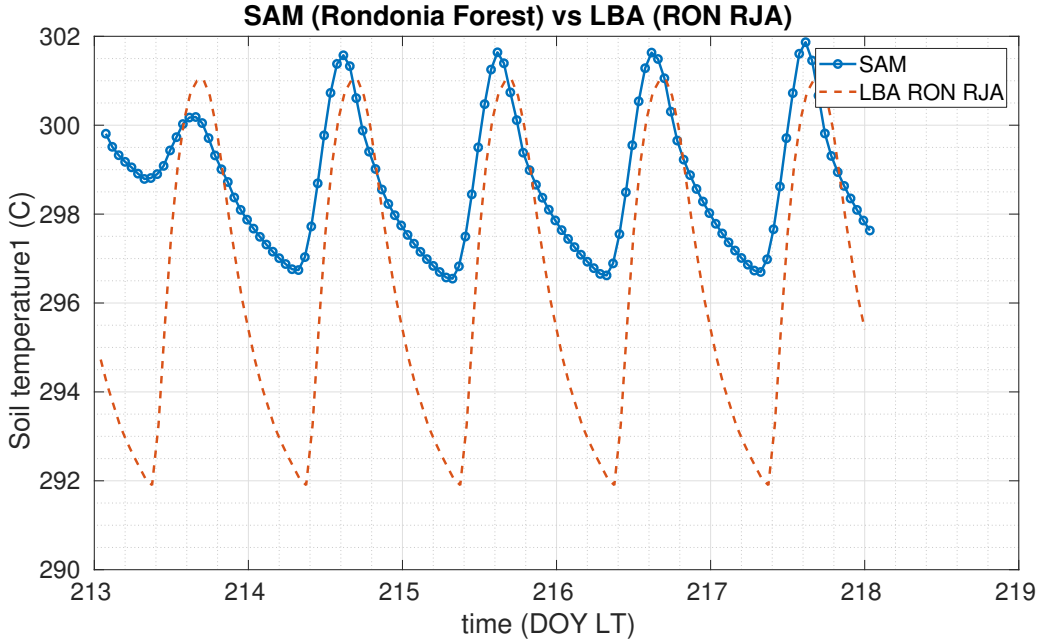


simulated near surface air (40m above sfc) and soil temperature (1cm below sfc) vs measured air temperature (~5m above ground)

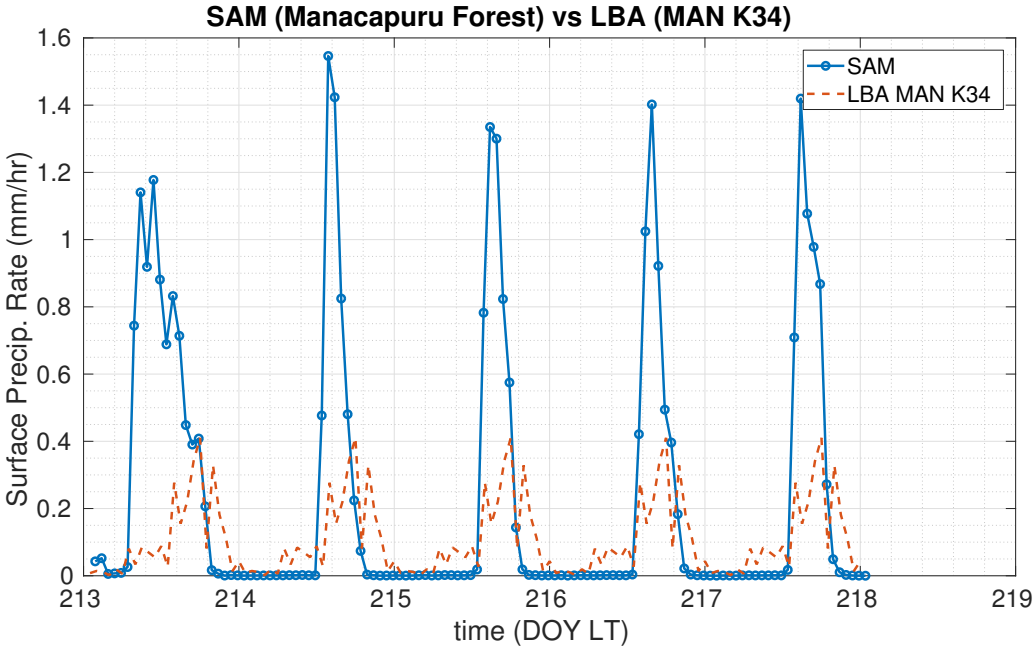


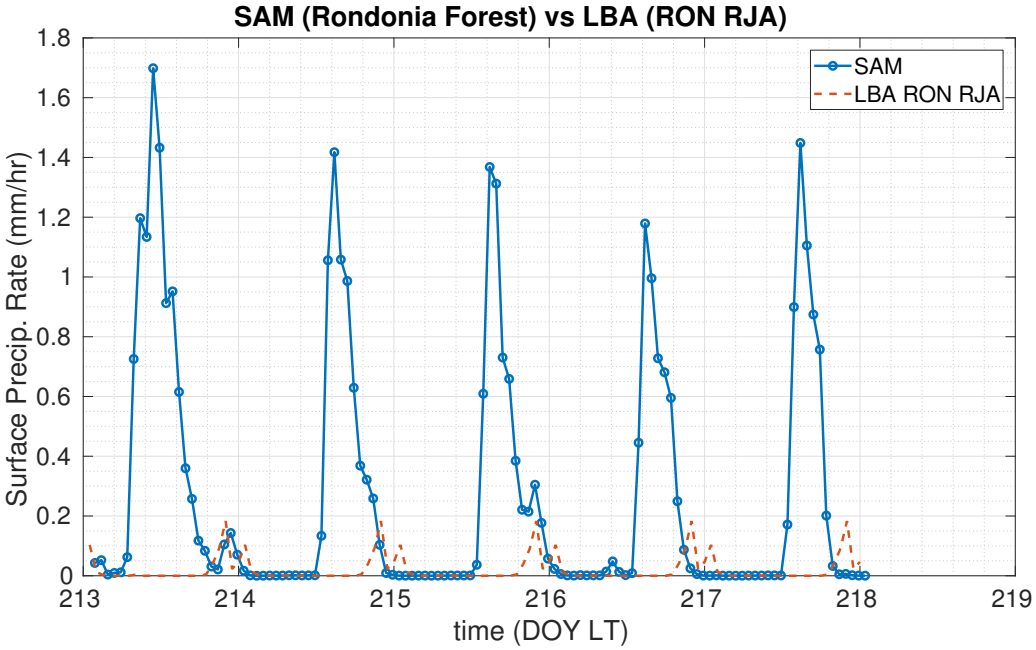






hourly rate of precipitation





simulated 4 day averages (2nd day to 5th day) versus monthly averaged LBA observations

	Latent Heat Flux (W/m2)	Sensible Heat Flux (W/m2)	Net Radiation (W/m2)	ground heat flux residual (W/m2)	Net Longwave at surface (W/m2)	Net shortwave at surface (W/m2)	near surface temperature (K)	Precipitation (mm/day)
SAM (Manacapuru)	94	22.6	124	-2.4	-50	174	298 (40m above sfc) 299 (1cm below sfc)	5.1
LBA (K 34)	98	35.5	154	20.7 (residual) -0.38 (measured)	-46	~206	299.6 (~5m above sfc)	2.7
SAM (Rondonia)	87	20	112	-3.7	-51.7	163	297.5 (40m above sfc) 298.6 (1cm below sfc)	5.7
LBA (Reserve Jaru)	84	28	145	32.2 (RESIDUAL) NAN (measured)	-49.4	194	296.3 (~5m above sfc)	0.511