

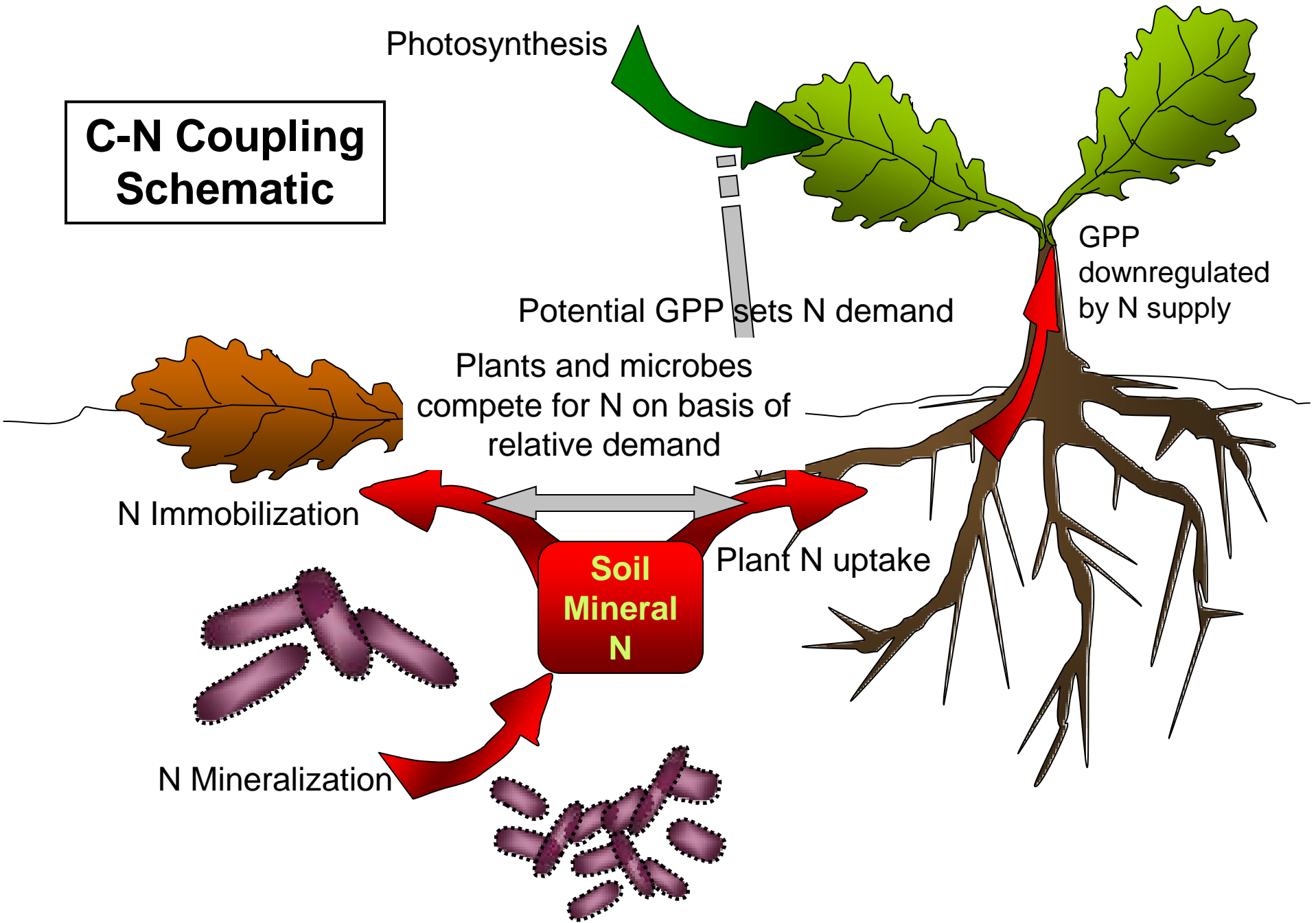
Evaluating modeled carbon state and flux variables against multiple NACP observational datasets

Peter Thornton, Gautam Bisht and
Daniel Ricciuto

CESM Workshop, June 2011



C-N Coupling Schematic

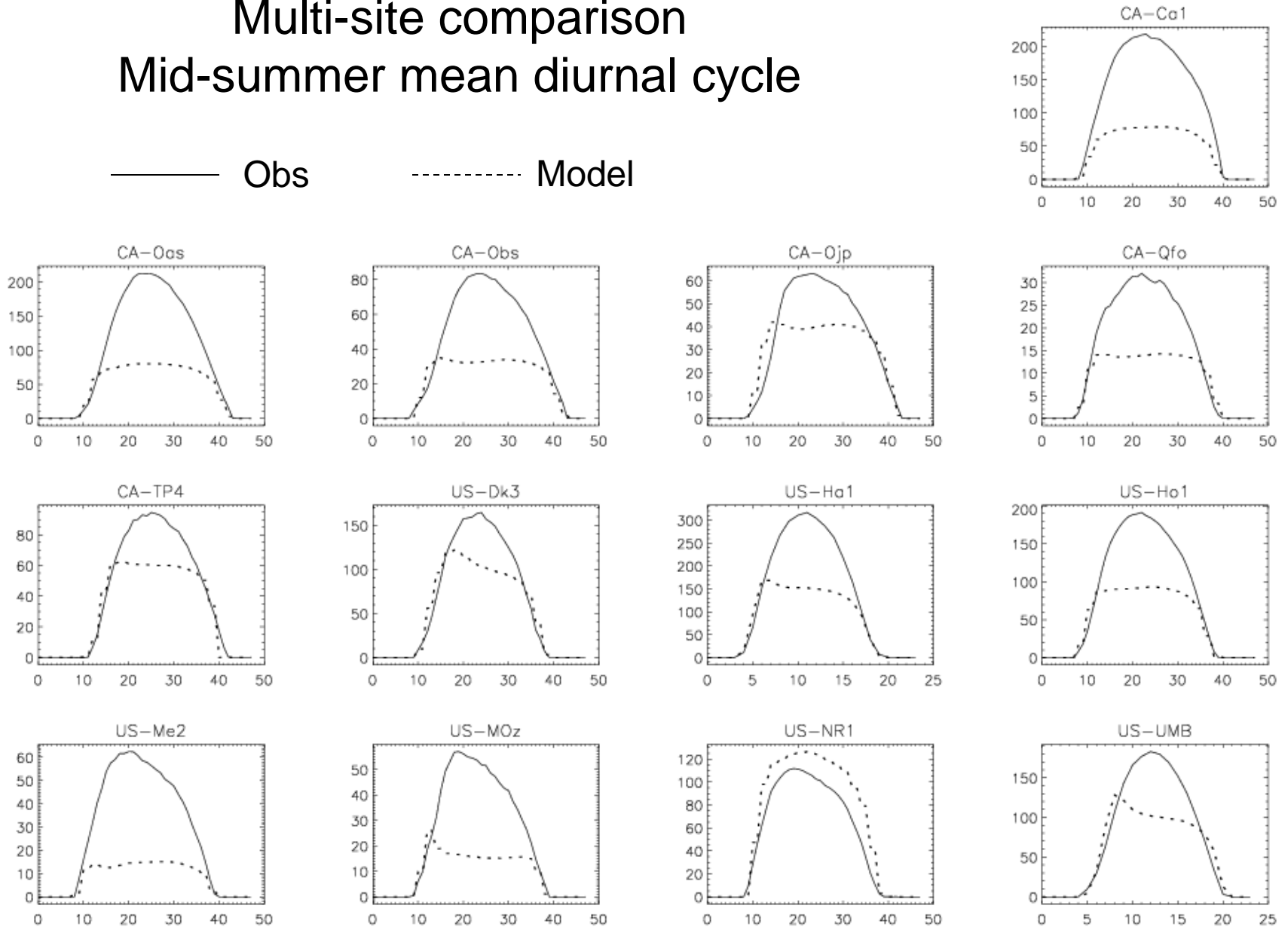


CLM-CN, GPP

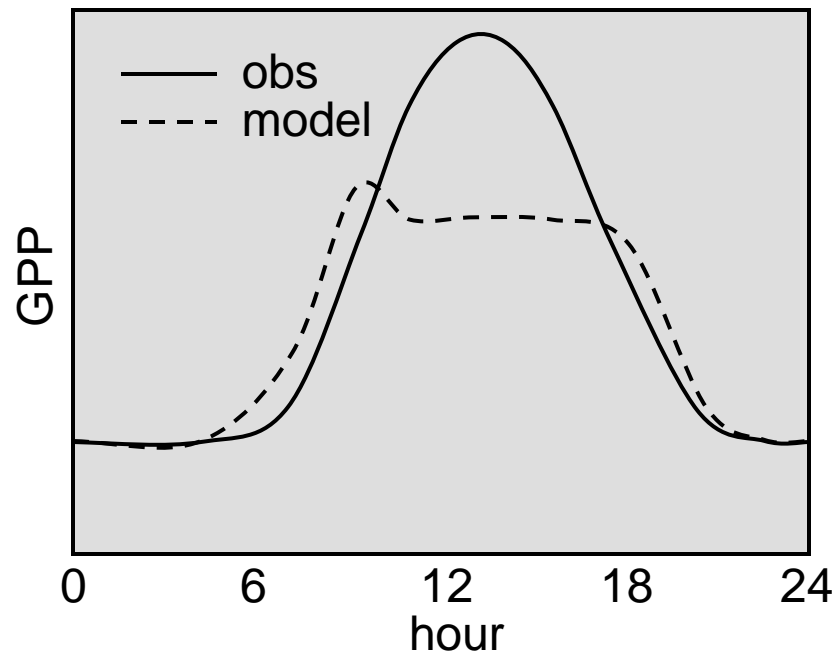
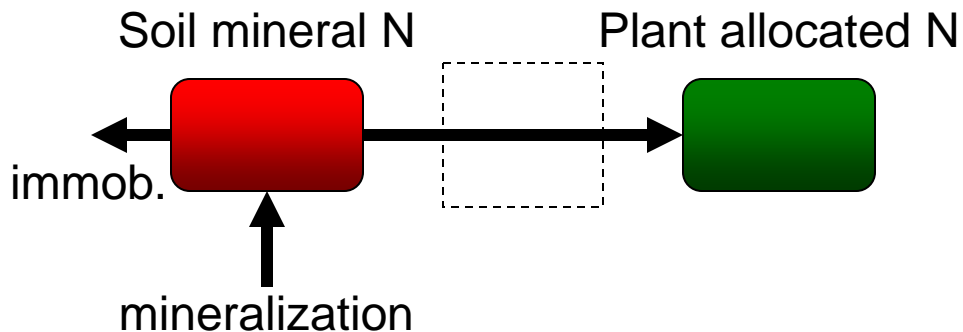
Multi-site comparison

Mid-summer mean diurnal cycle

—— Obs - - - - - Model



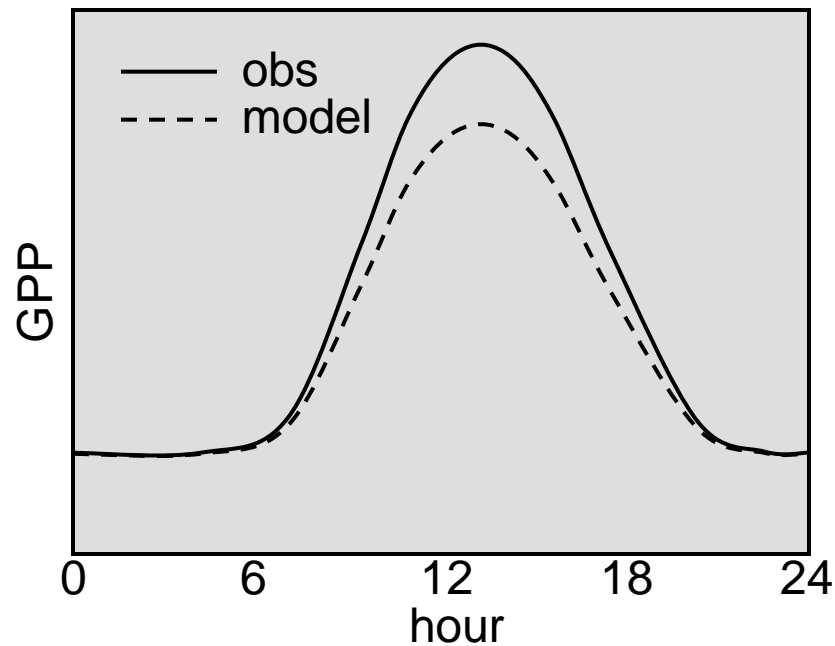
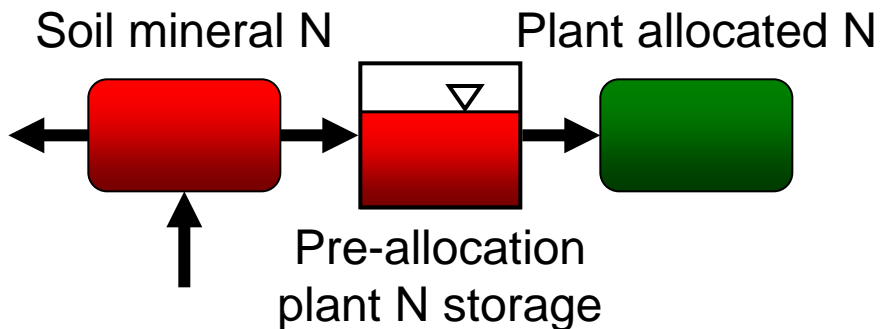
Original model: no plant N storage pool



Revised model: plant N storage pool

N to storage \propto (demand, availability)

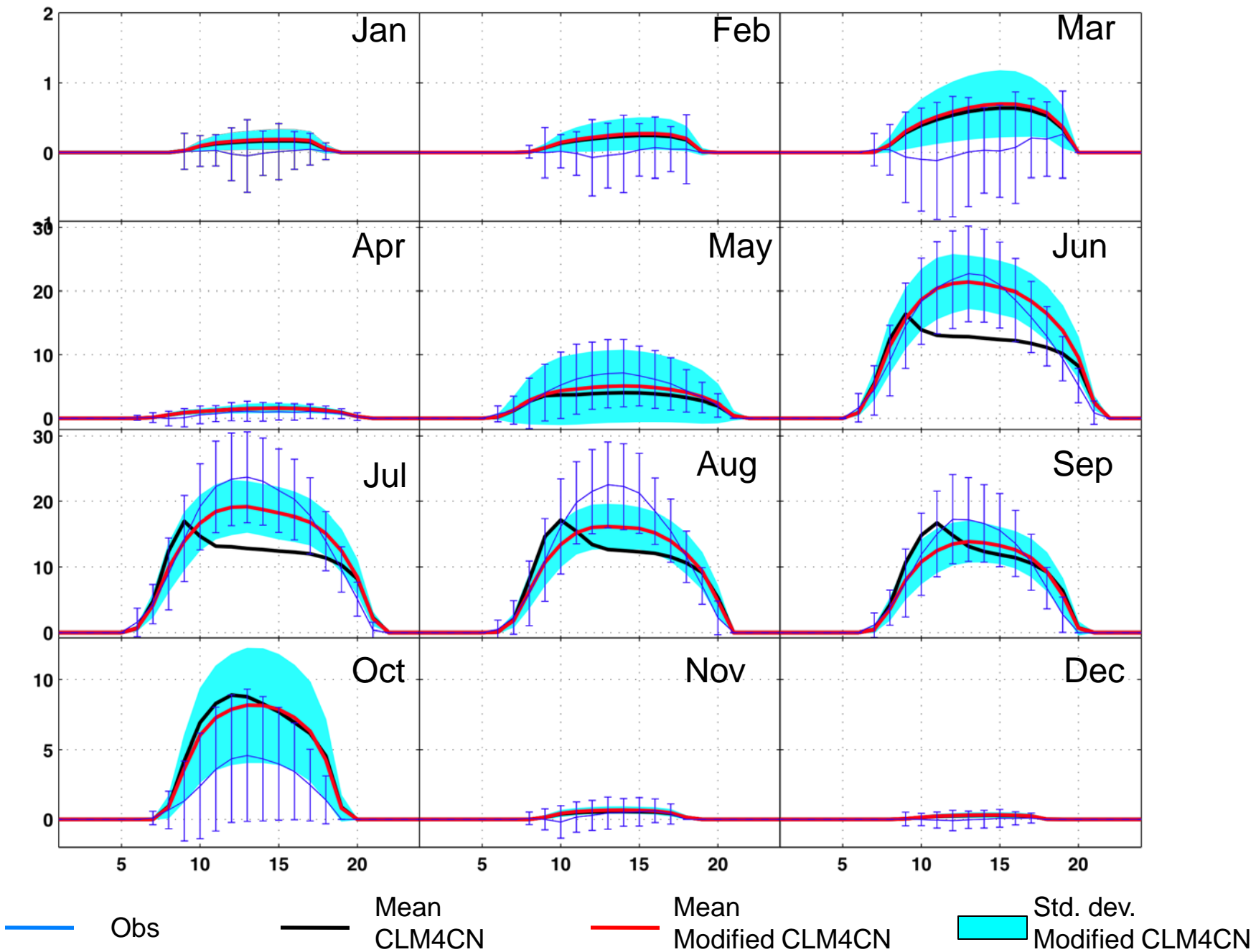
N from storage \propto (demand, storage)



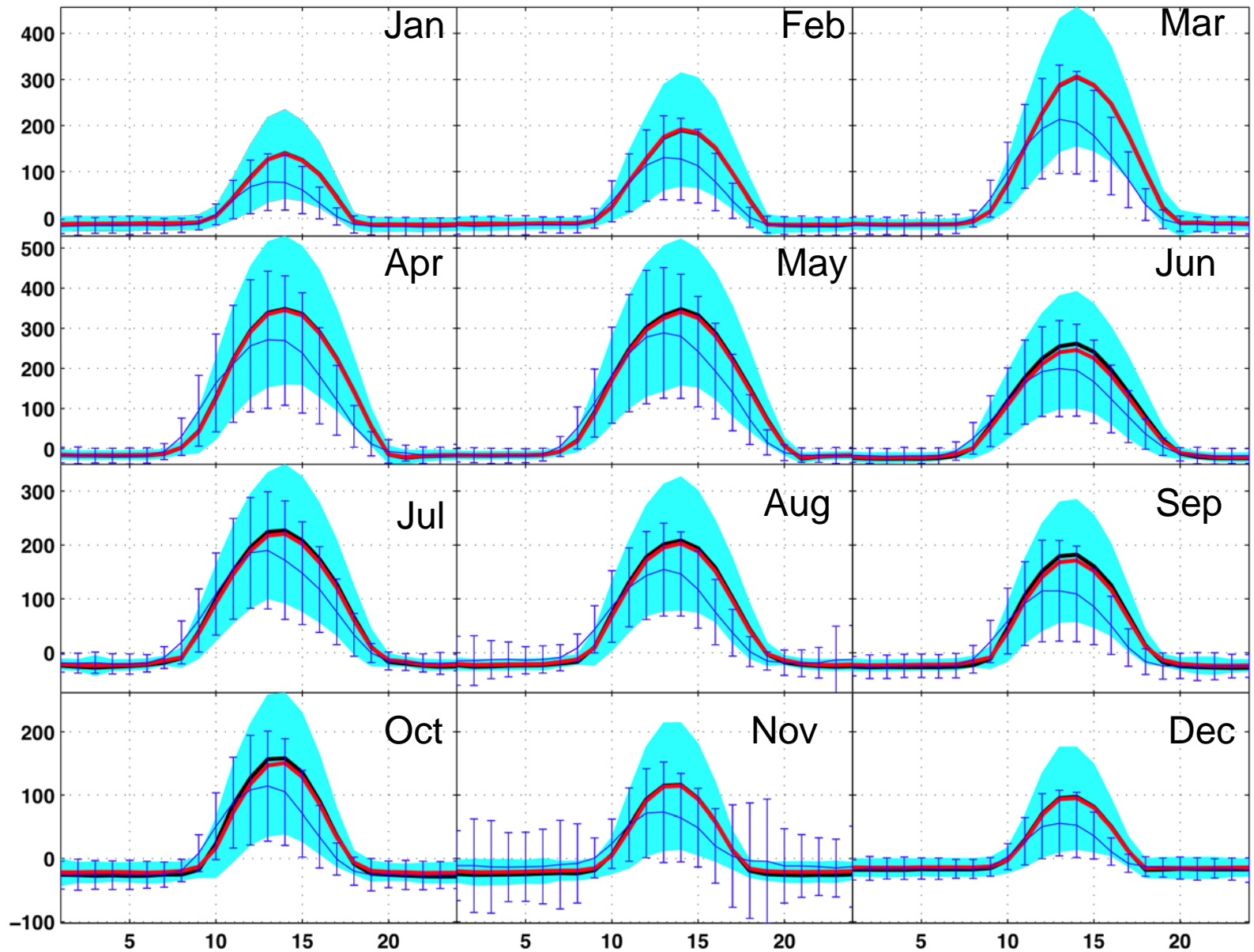
This approach works to some extent at all sites...

Best example: University of Michigan Biological Station (US-UMB)

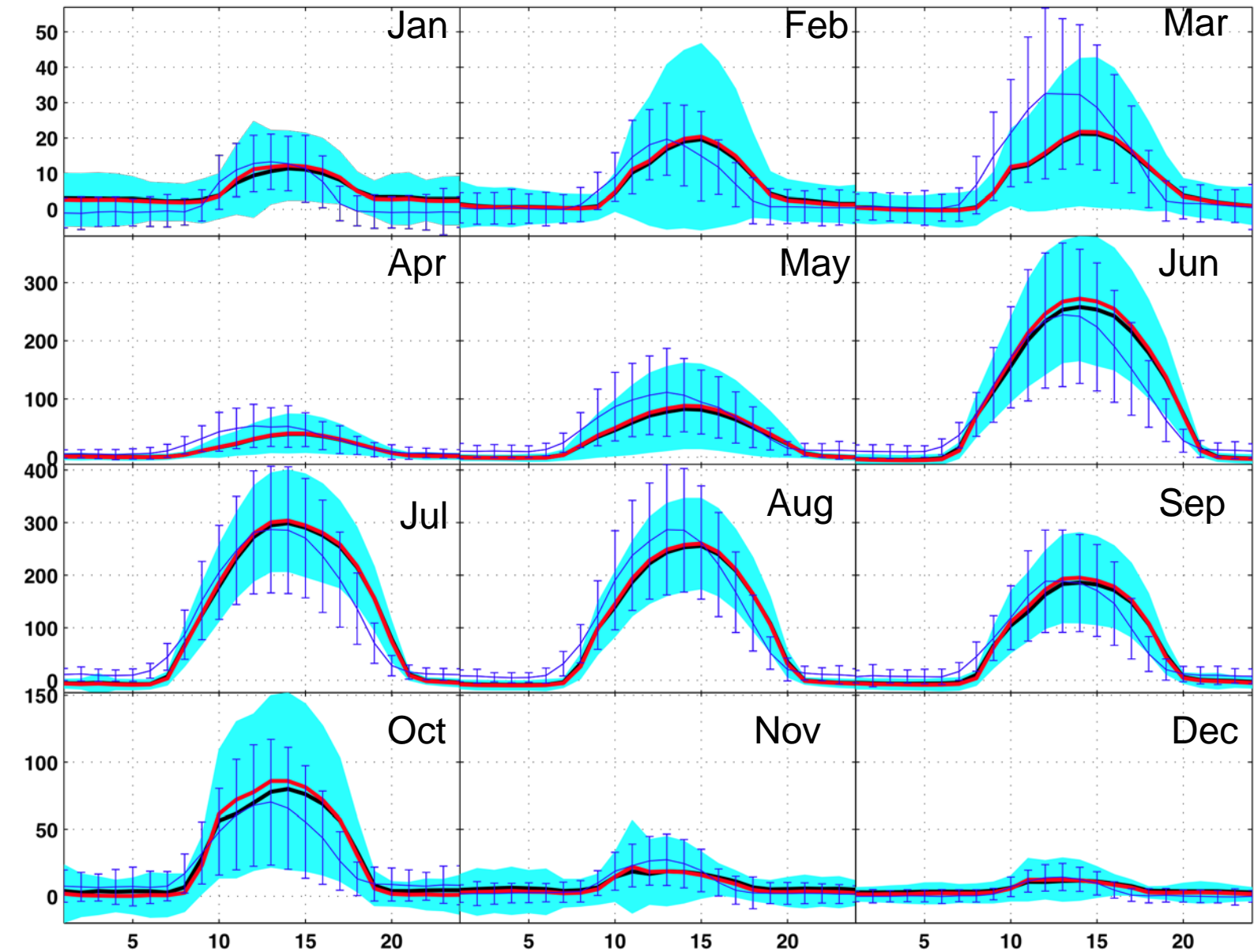
US-UMB-RUN3: GPP



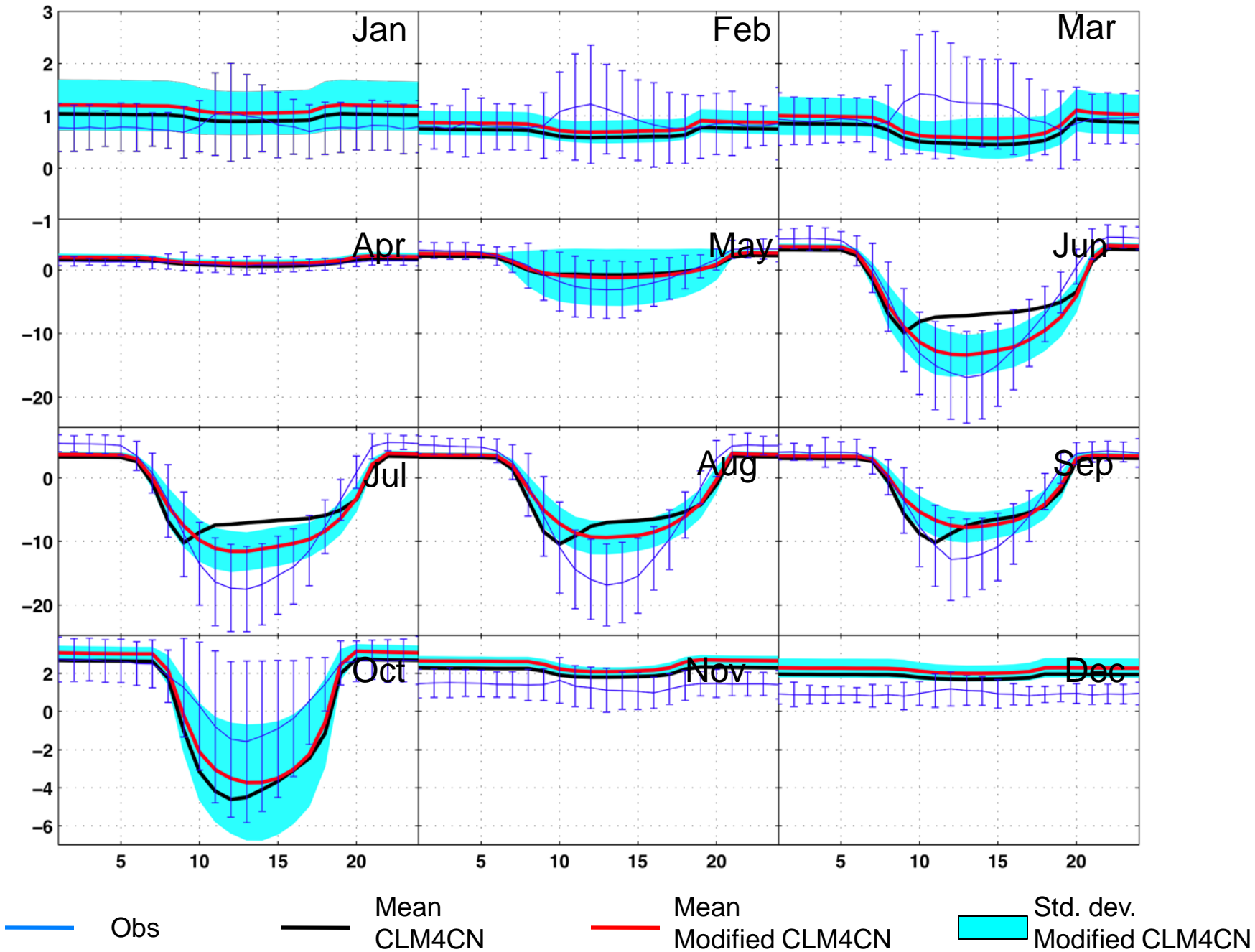
US-UMB-RUN3: H



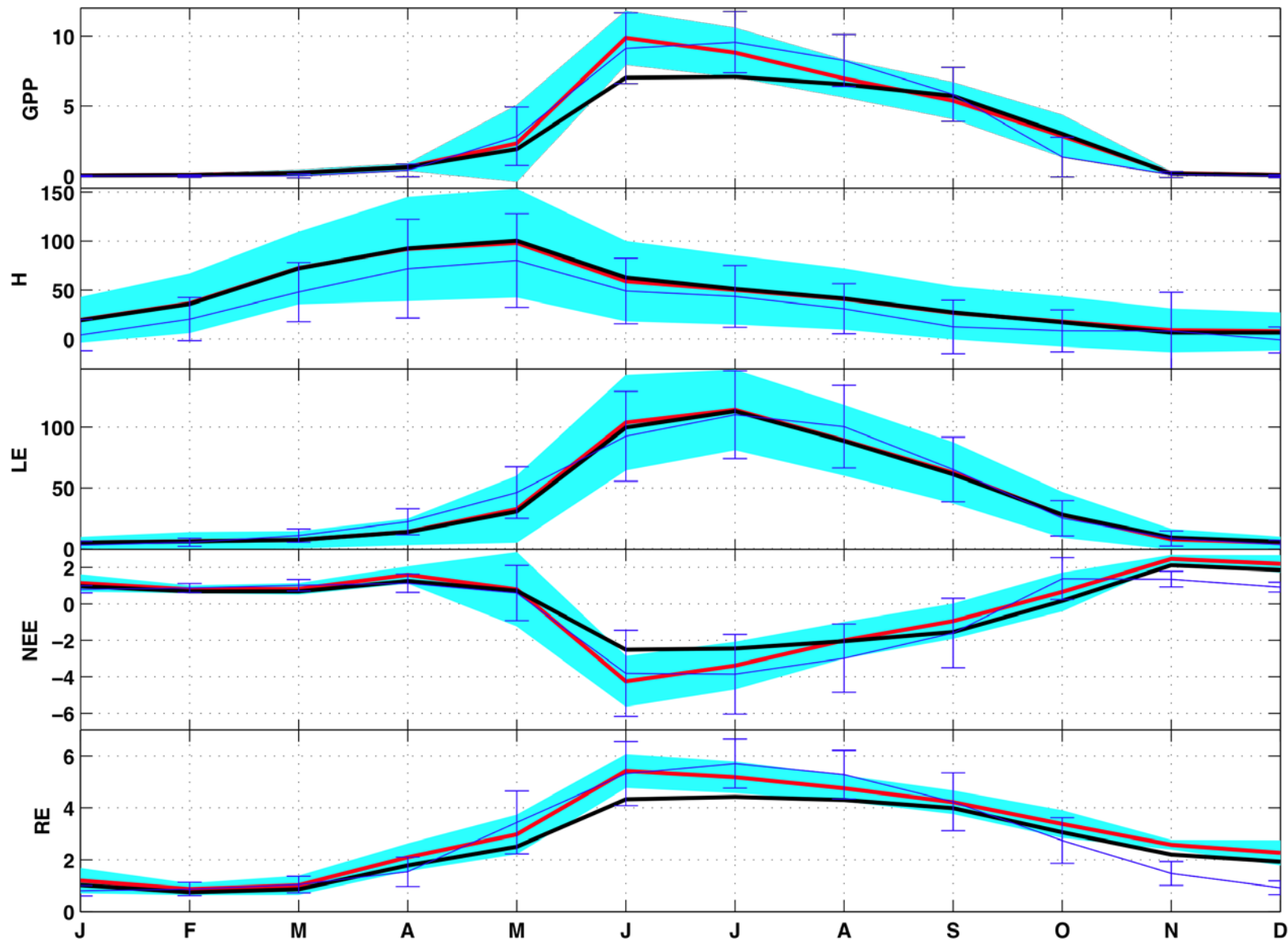
US-UMB-RUN3: LE



US-UMB-RUN3: NEE



US-UMB-RUN3

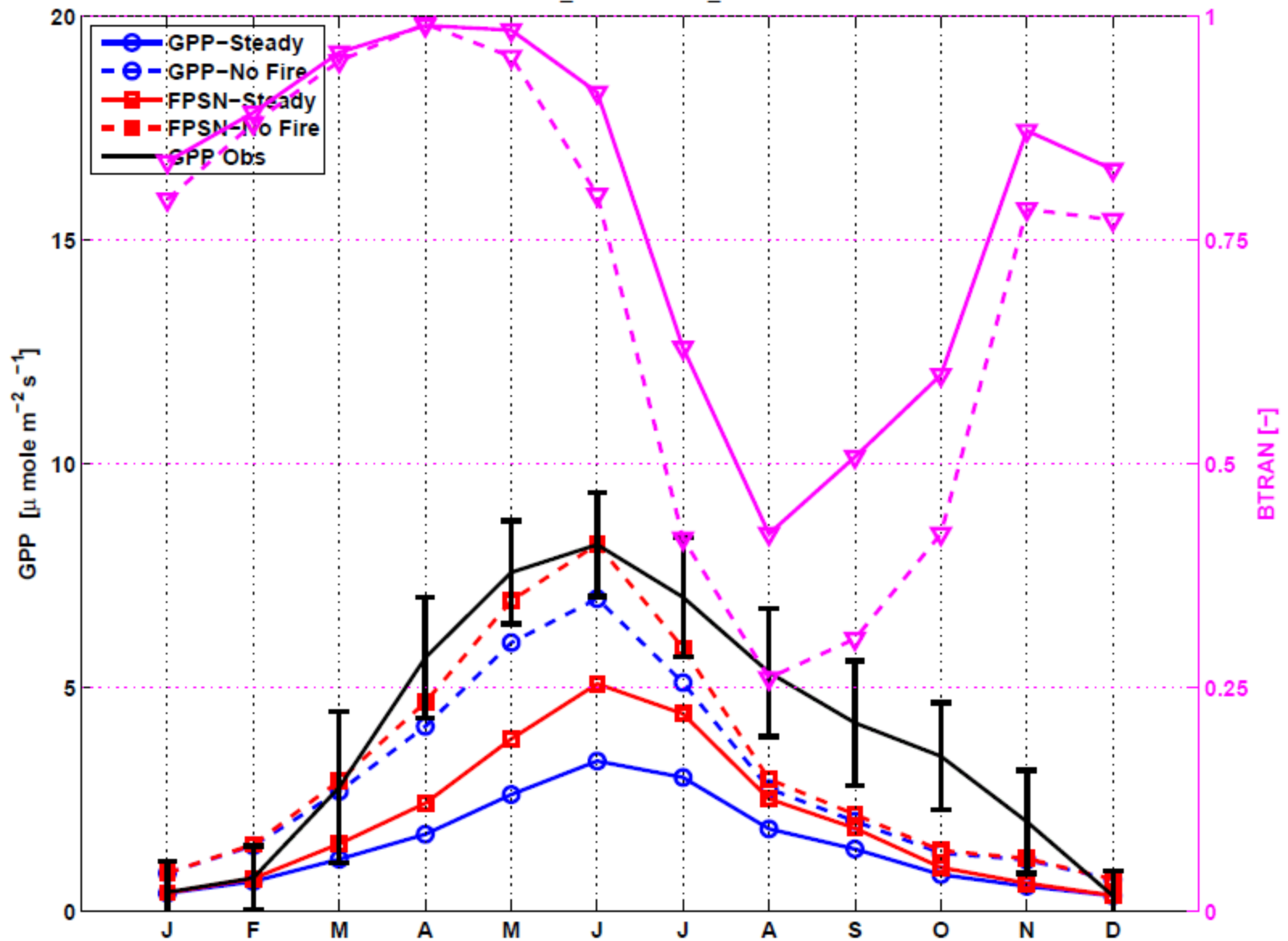


At some sites there is still a significant bias in the seasonal cycle of GPP, Re, and NEE

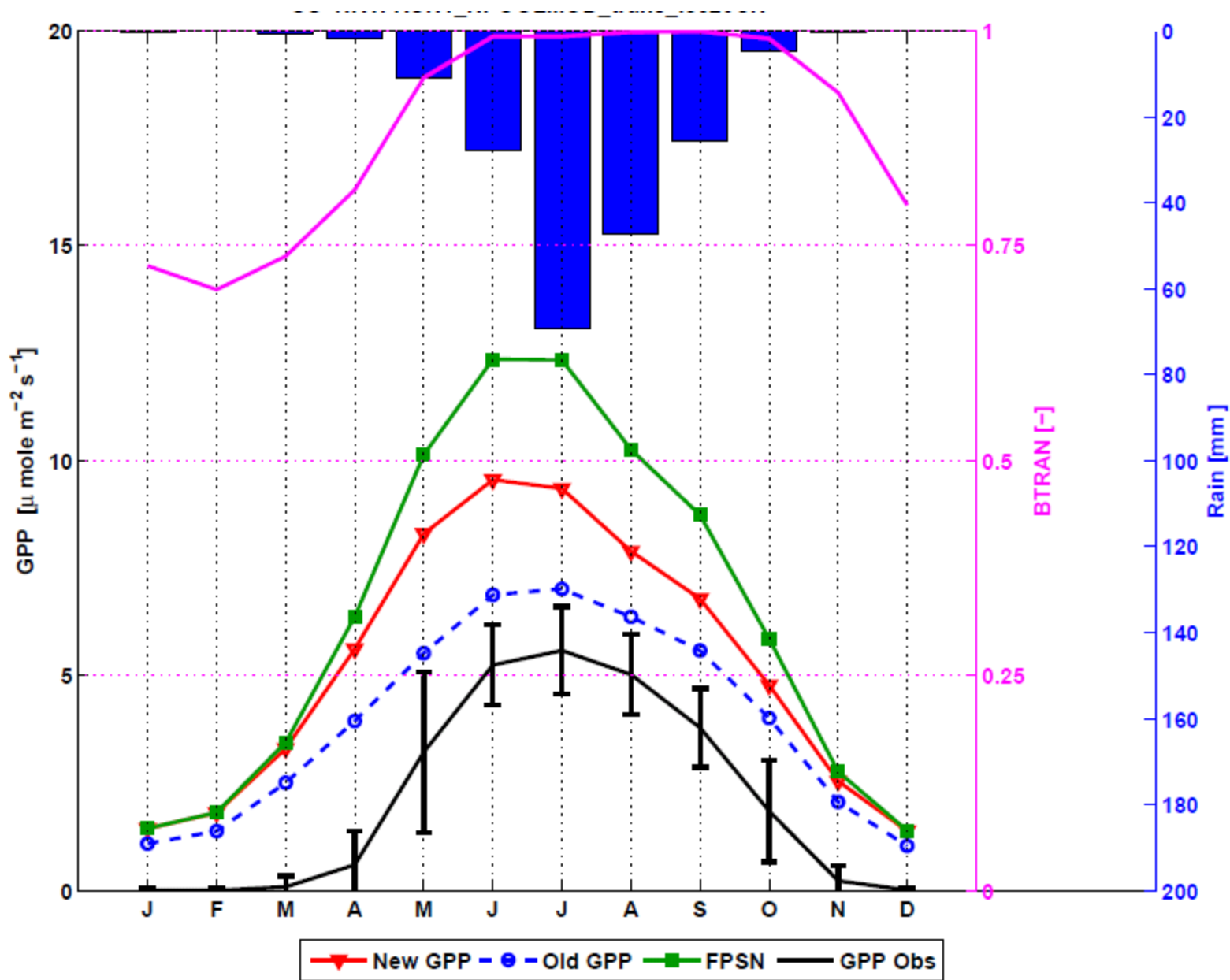
Metolius, OR: low GPP bias

Niwot Ridge, CO: high GPP bias

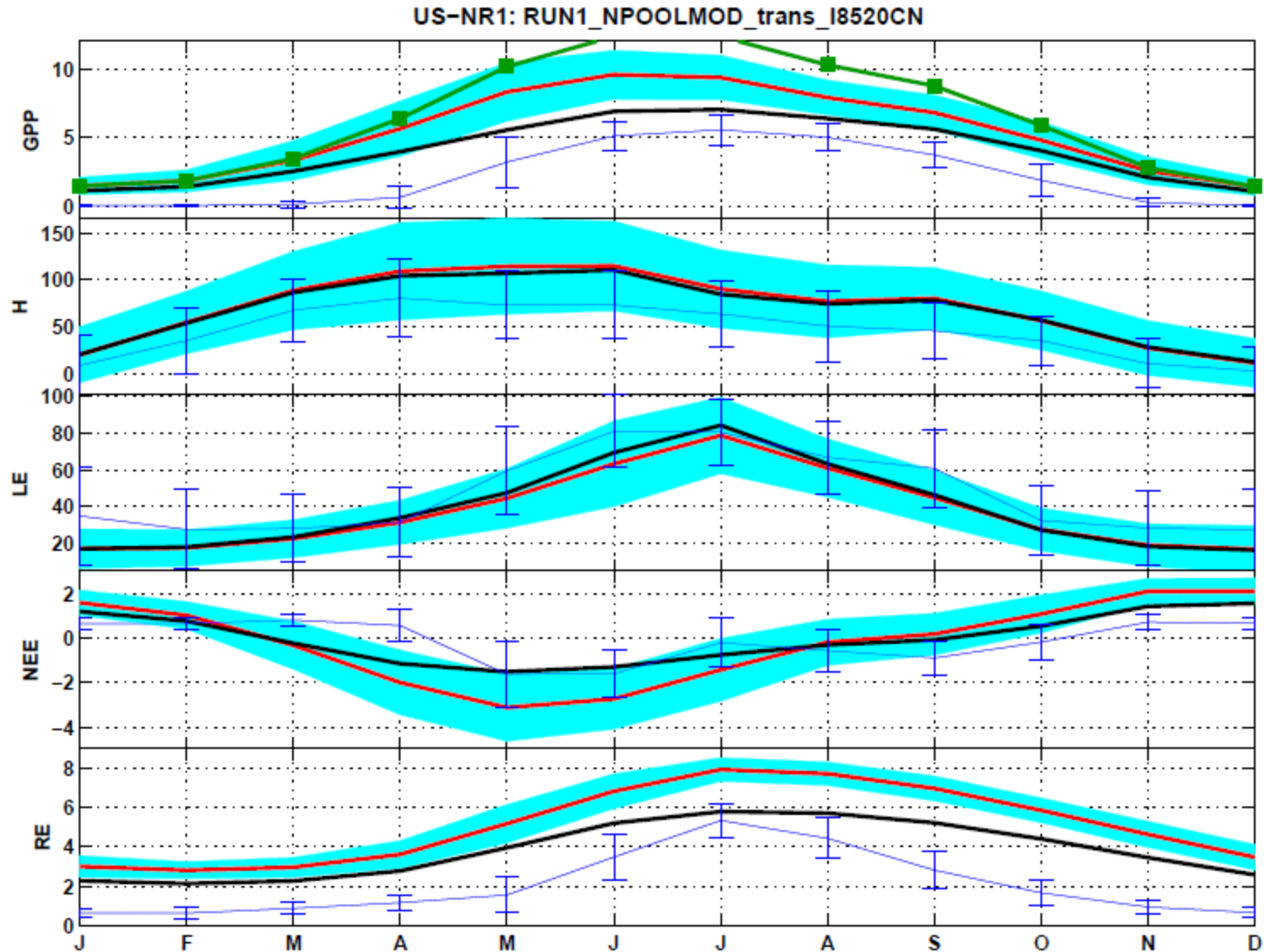
Metolius, OR: Simulation of fire appears to play a major role in low GPP bias



Niwot Ridge, CO: Cold-season high bias in GPP



Niwot Ridge, CO: Cold-season bias in GPP and RE



Next steps:

- Exploring additional modifications to the N storage pool algorithm to improve late-season N availability.
- Depth-resolved soil organic matter may play an important role in setting the seasonal cycle of Re and N availability in colder climates, which would influence GPP and NEE.