Simulating Precipitation in the Lake Champlain Basin Using a Regional Climate Model (WRF)

Huanping Huang

June 4, 2019

BREE
Basin Resilience to Extreme Events in the Lake Champlain Basin

https://manosh.com/lake-champlain/

WRF Evaluation: Experiments Setup

- Evaluating the sensitivity of simulated temperature and precipitation to different WRF physics schemes
- Three five-year periods: 1980–1984, 1995–1999, and 2010–2014
- Reference dataset: Daymet (gridded observations)

Scheme	**CKWY**
Radiation	CAM
Cumulus	Kain-Fritsch
Microphysics	WSM6
Planetary Boundary Layer	YSU

RKWY
RRTMG
Kain-Fritsch
WSM6
YSU

RNWY
RRTMG
New SAS
WSM6
YSU

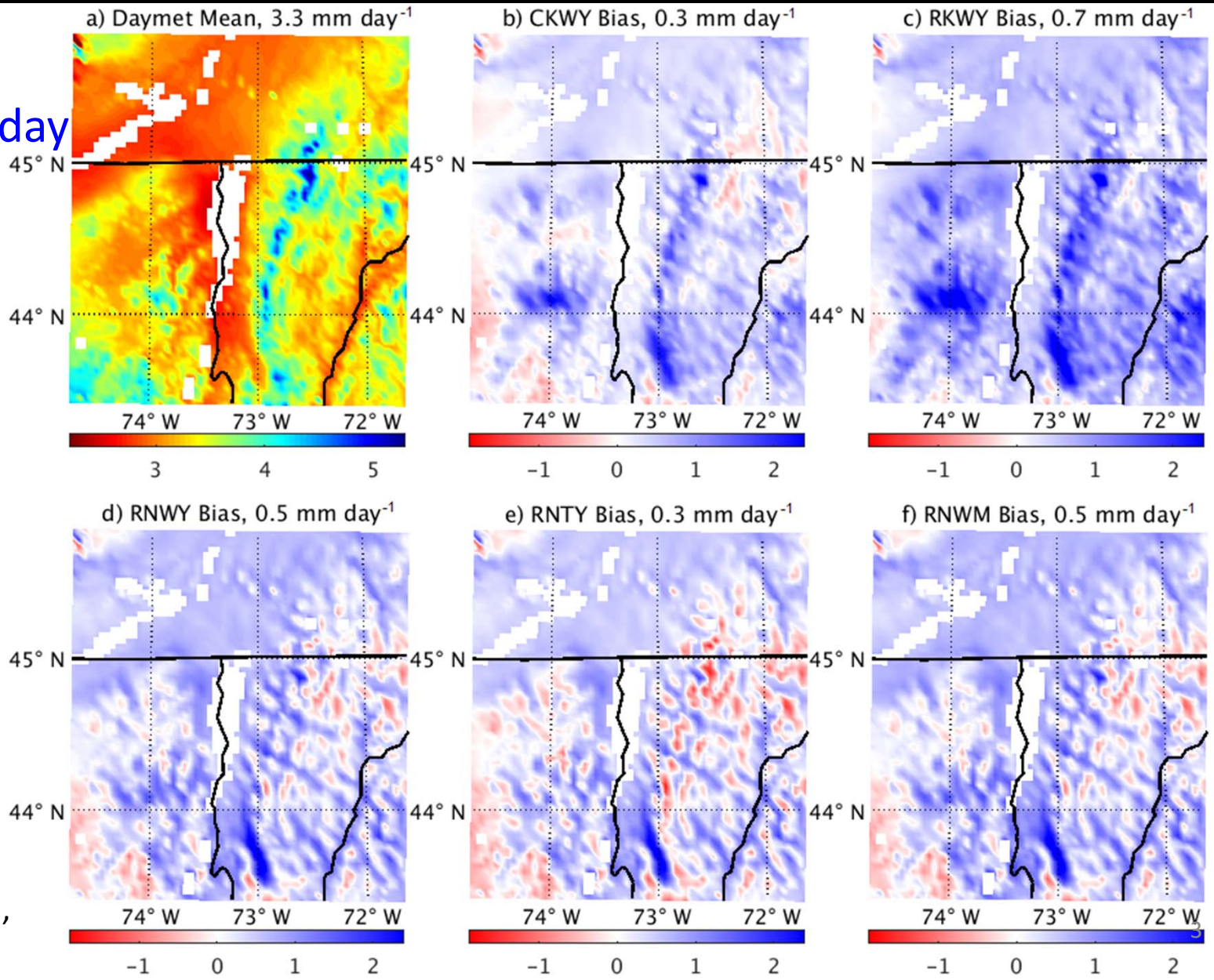
RNTY
RRTMG
New SAS
Thompson
YSU

RNWM
RRTMG
New SAS
WSM6
MYJ

Huang et al., submitted

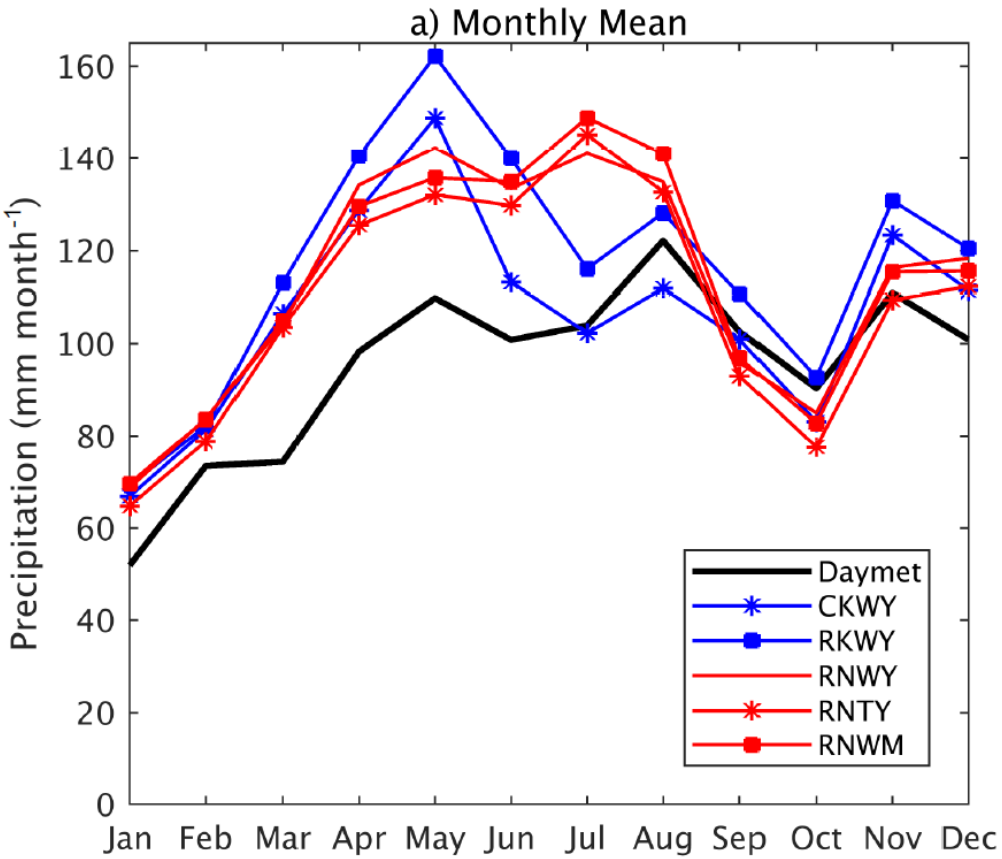
Mean Precipitation Bias: 0.3-0.7 mm/day (9-21%)

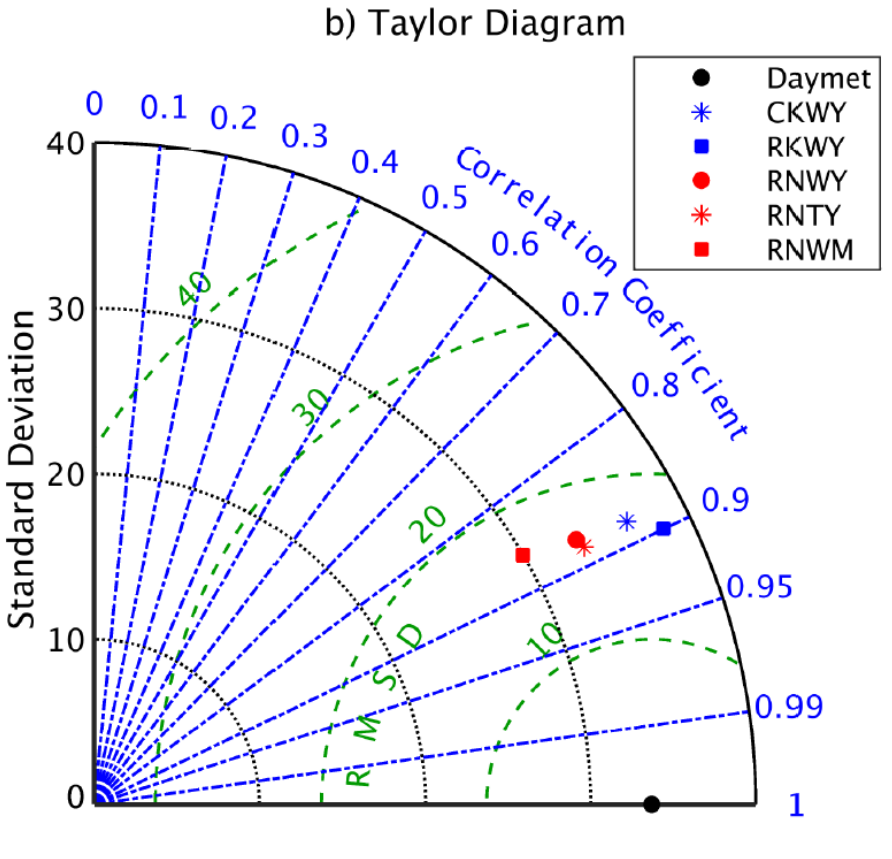
Daymet:
3.3 mm/day



Huang et al., submitted

- Seasonal cycle preserved, but with overestimation in most months
- Similar precipitation variability across all simulations

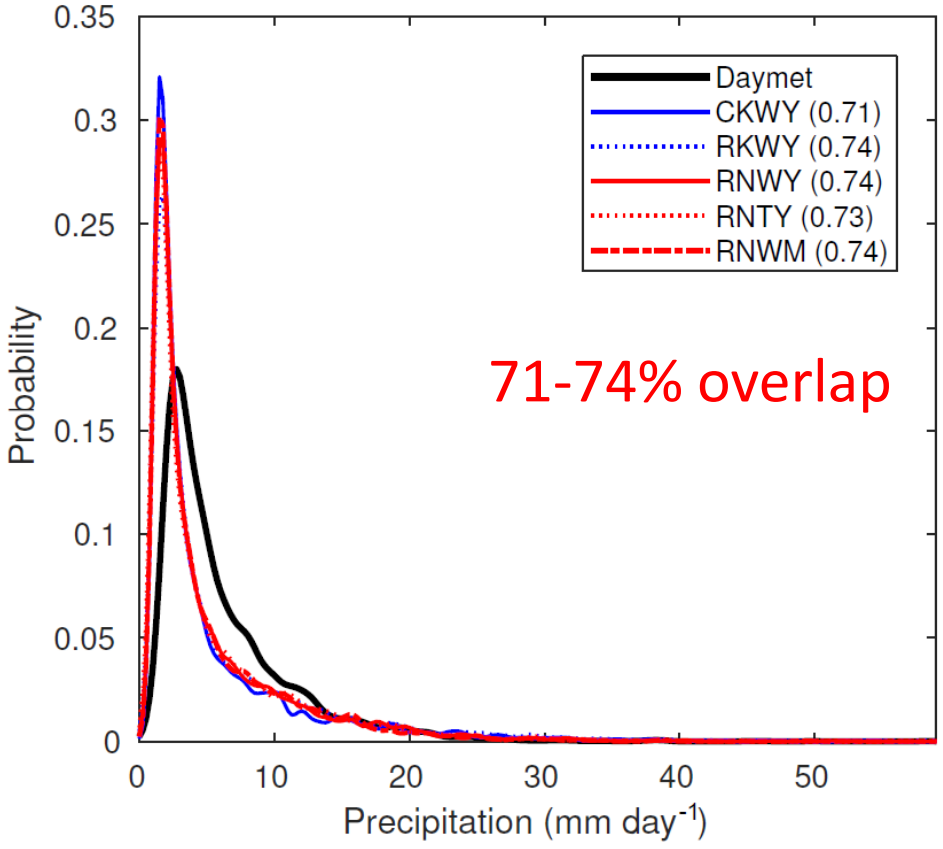




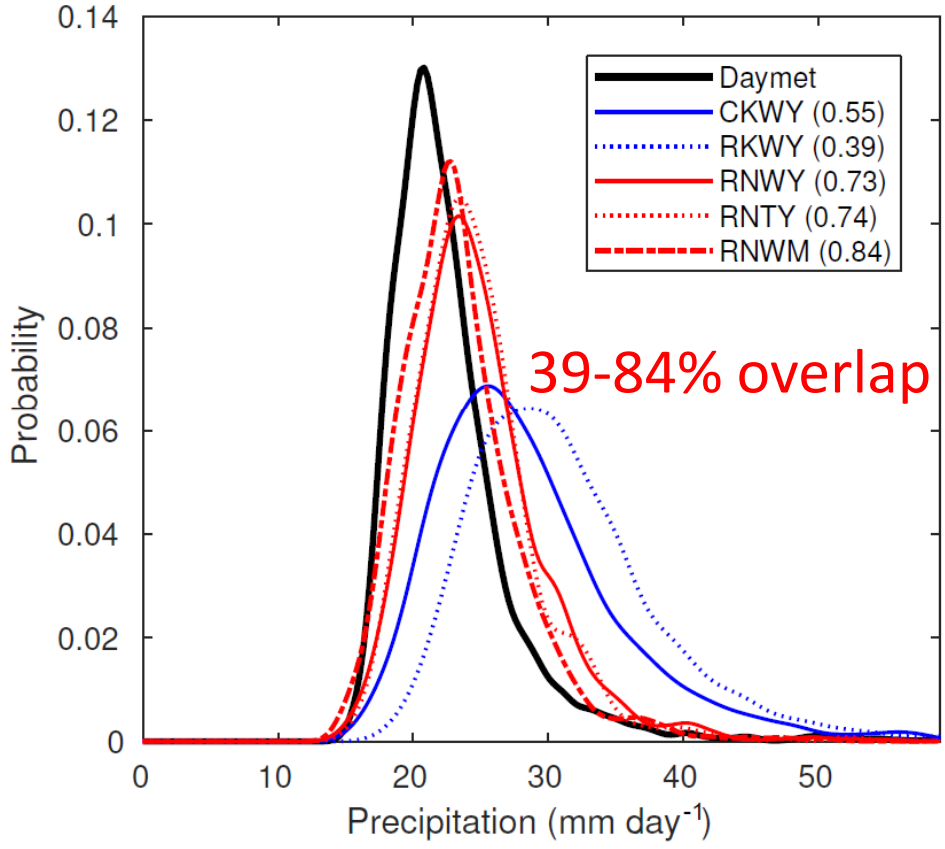
Huang et al., submitted

Similar ability to reproduce observed precipitation for wet days, but very distinct skills in capturing extremes

Wet days



90th percentile wet days



Huang et al., submitted

Summary

- WRF simulations over the Lake Champlain Basin generally reproduce the observed precipitation seasonal cycles, but have wet biases (9–21%).
- All configurations have similar capabilities in simulating precipitation on wet days (74%), but show different skills in capturing extreme precipitation.
- Overall, RNWM configuration best reproduces observed climate, especially extreme precipitation.

BREE
Basin Resilience to Extreme Events
in the Lake Champlain Basin