WAIS Divide
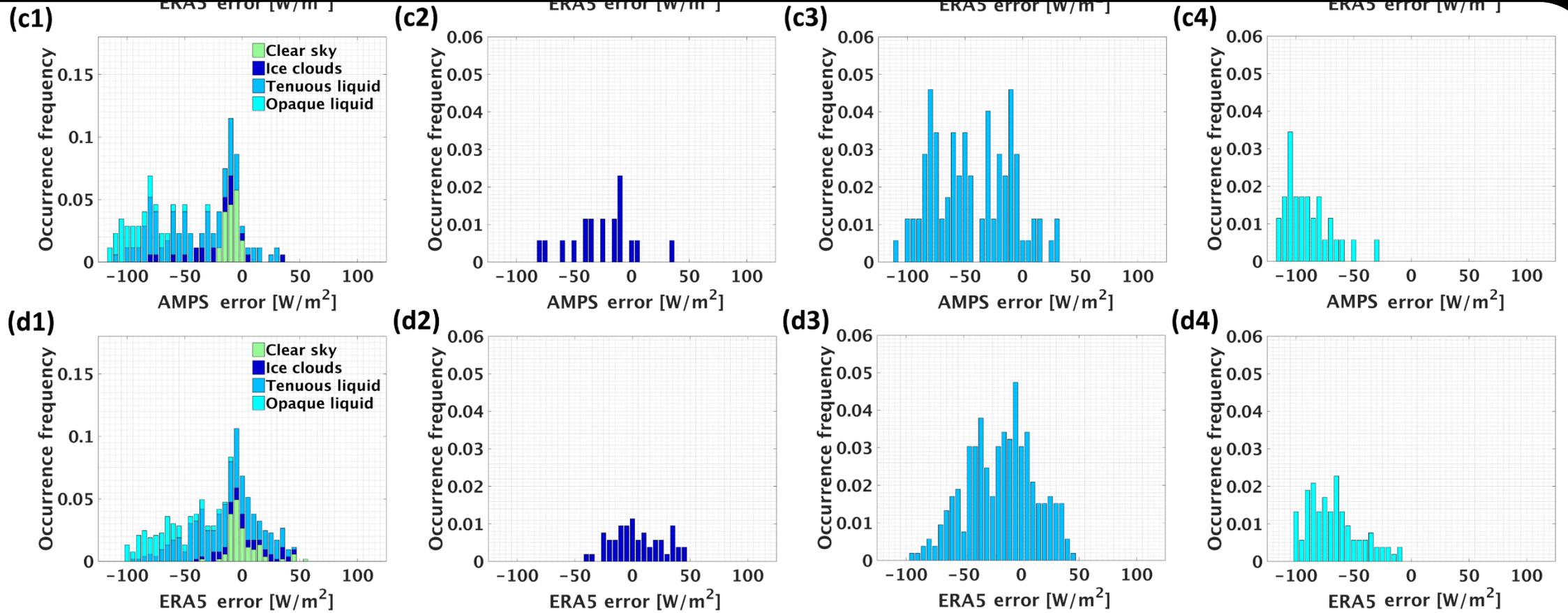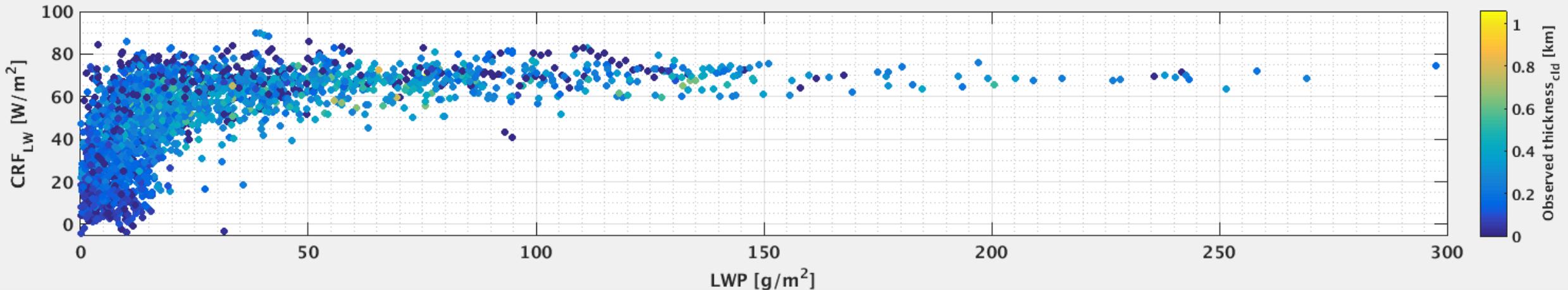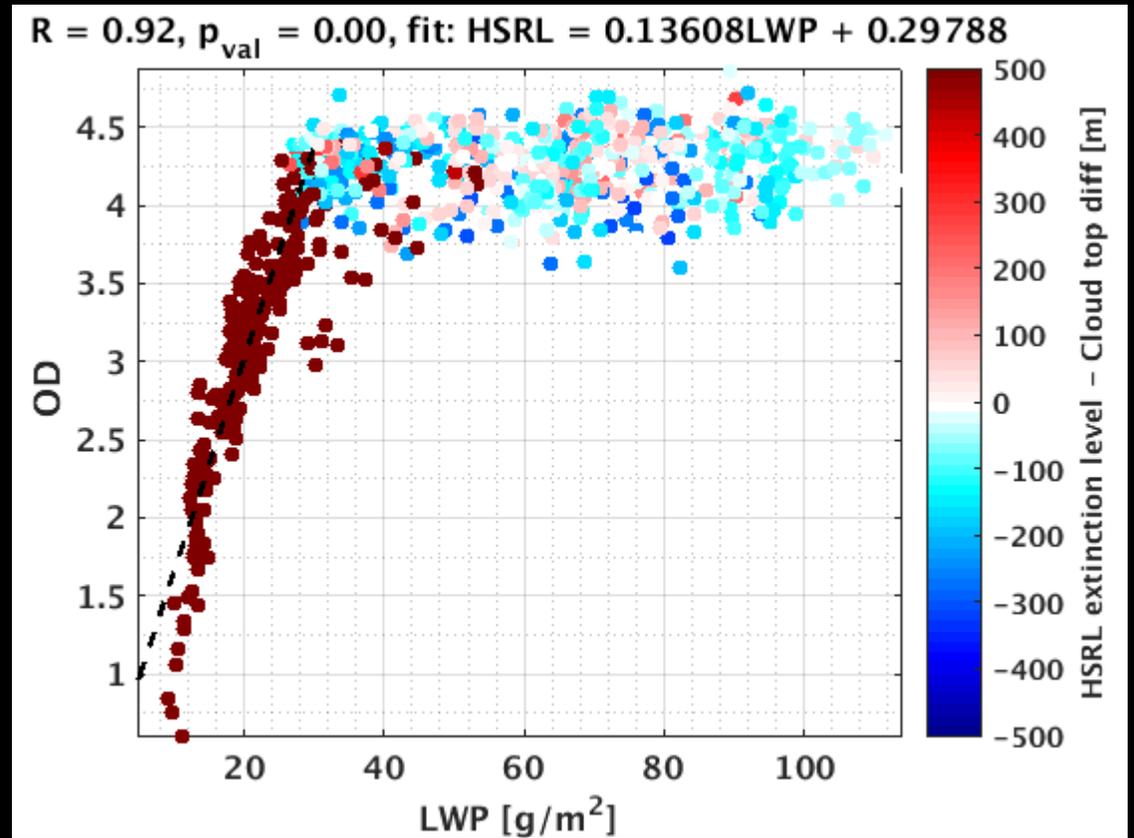
Liquid-bearing cloud visible OD correspondence with LW opacity

Liquid and Ice Water Paths Comparisons – ERA-5

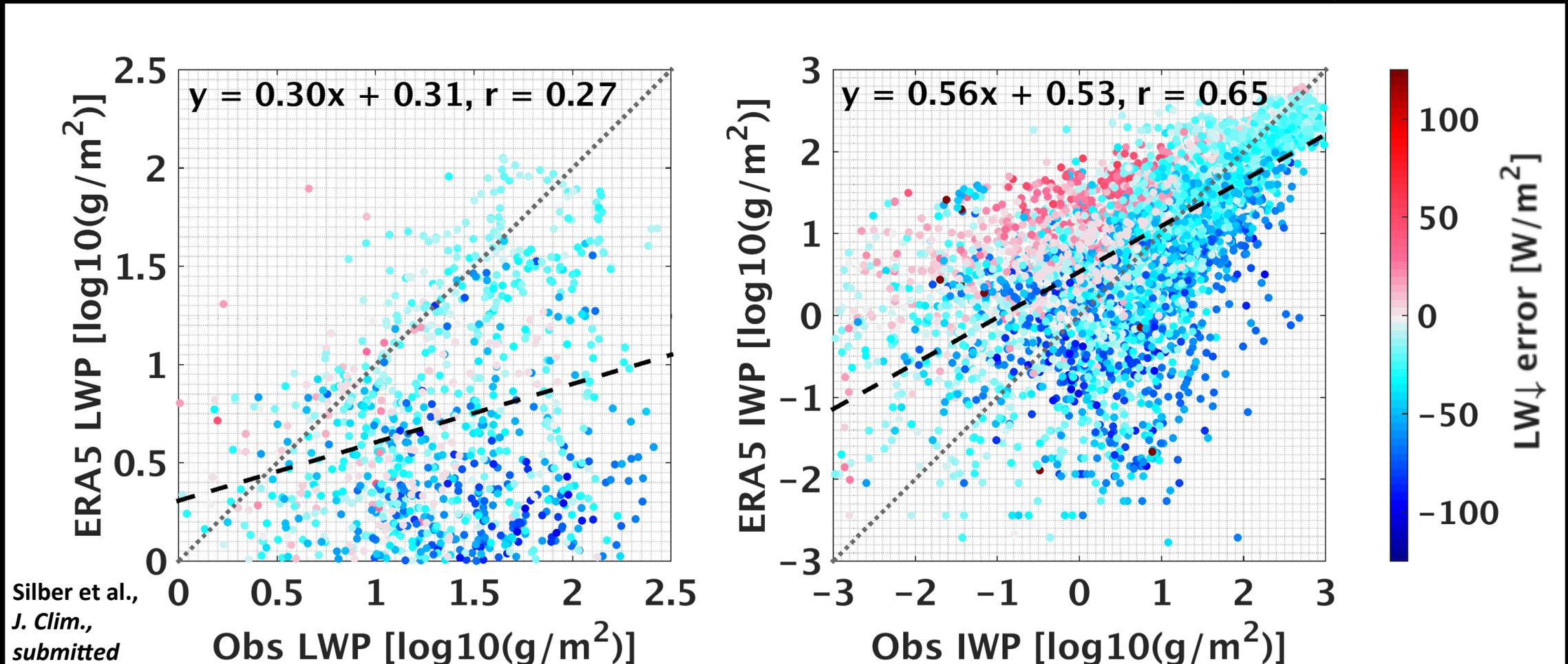**Observed liquid & no model liquid – 61%**

Model liquid & no observed liquid – 56%

No correlation

Observed ice & no model ice – 24%

Model ice & no observed ice – 27%

Reasonable correlation, mainly at higher IWP

Silber et al., J. Clim., submitted

Liquid and Ice Water Paths Comparisons – AMPS

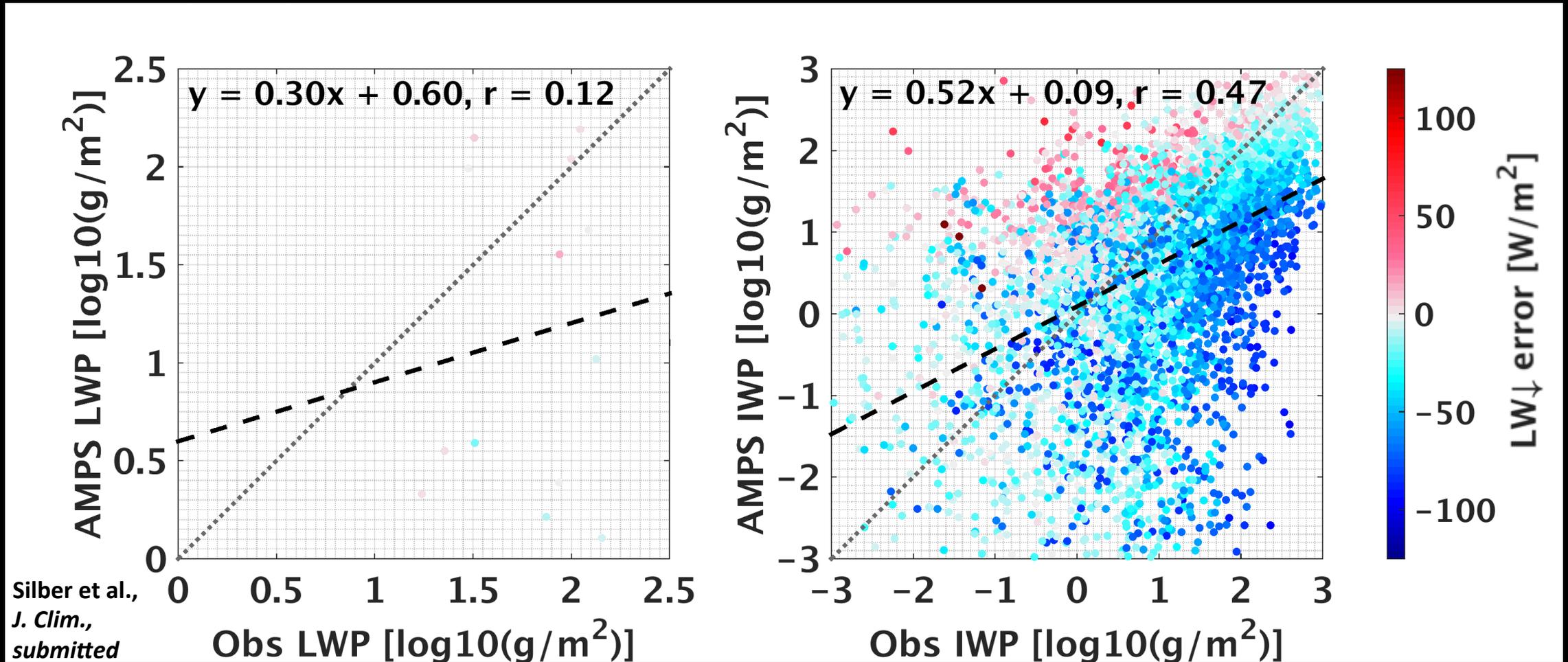**Observed liquid & no model liquid – 99.5%**

Model liquid & no observed liquid – 35%

Not many data points to correlate…

Observed ice & no model ice – 15%

Model ice & no observed ice – 25%

**Weak correlation at higher IWP values**

Silber et al., *J. Clim., submitted*

Resolved Cloud Mask

- Hourly cloud masks are generated using the observations from the AWARE campaign.

- Cloud occurrence time series is derived from the resolved cloud masks.

We will examine the model performance in three different cloud regimes:
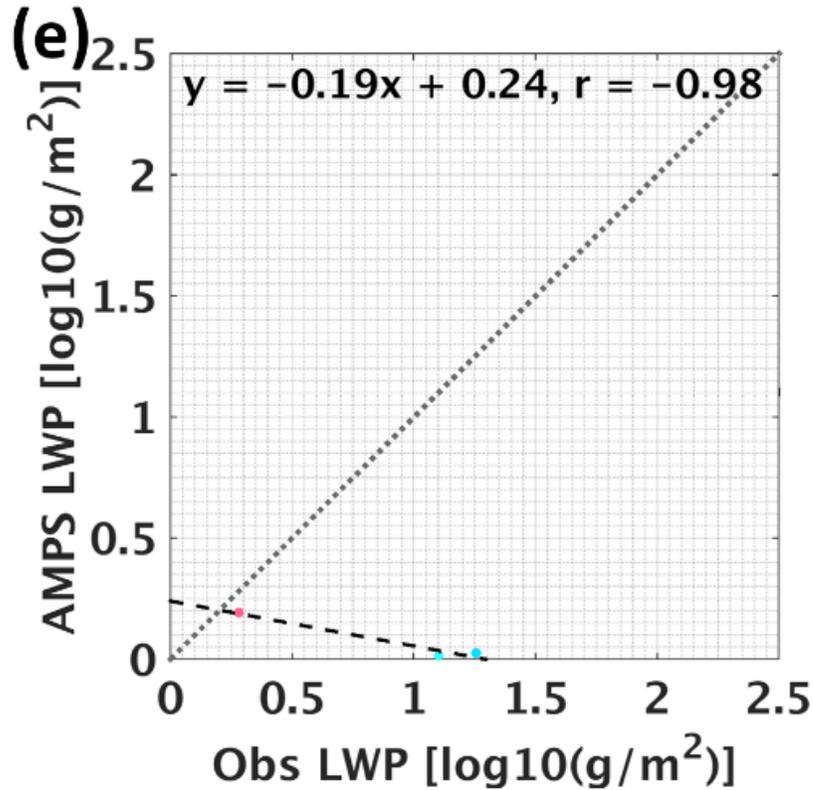1. Tenuous liquid-bearing (mixed-phase) clouds (LWP < 25 g/m²).
2. Opaque liquid-bearing (mixed-phase) clouds (LWP ≥ 25 g/m²).
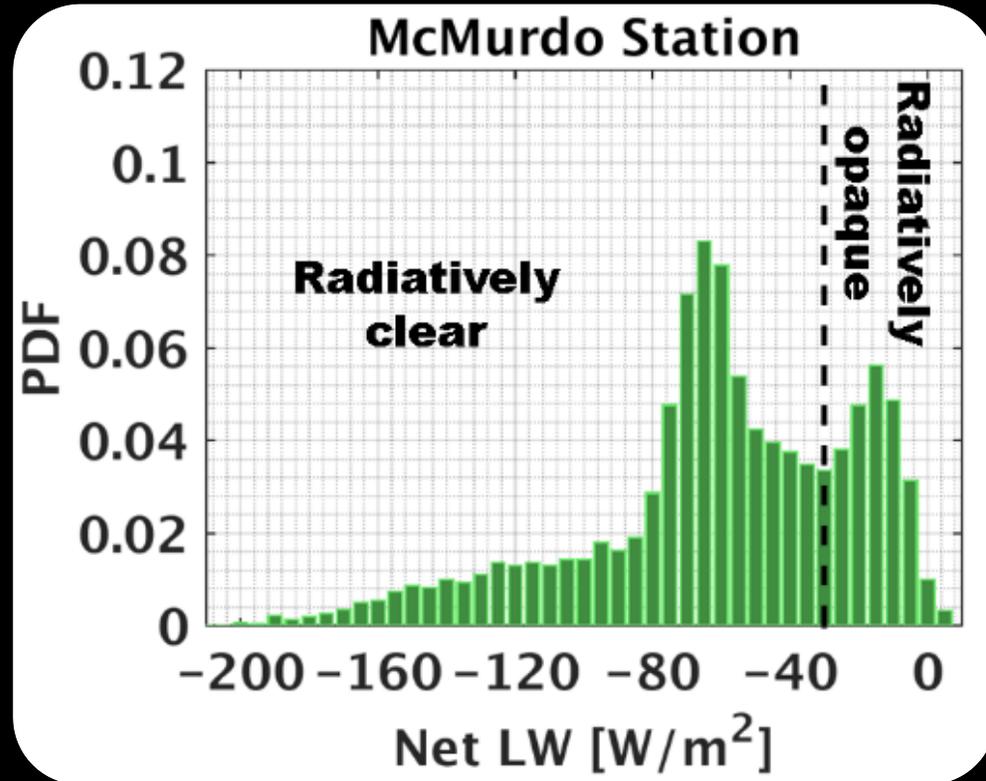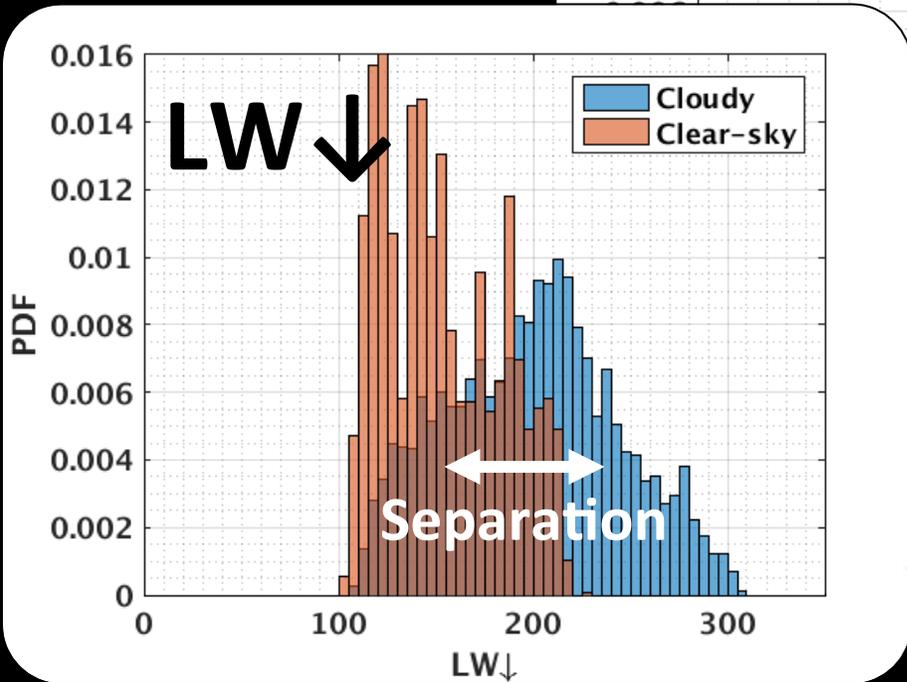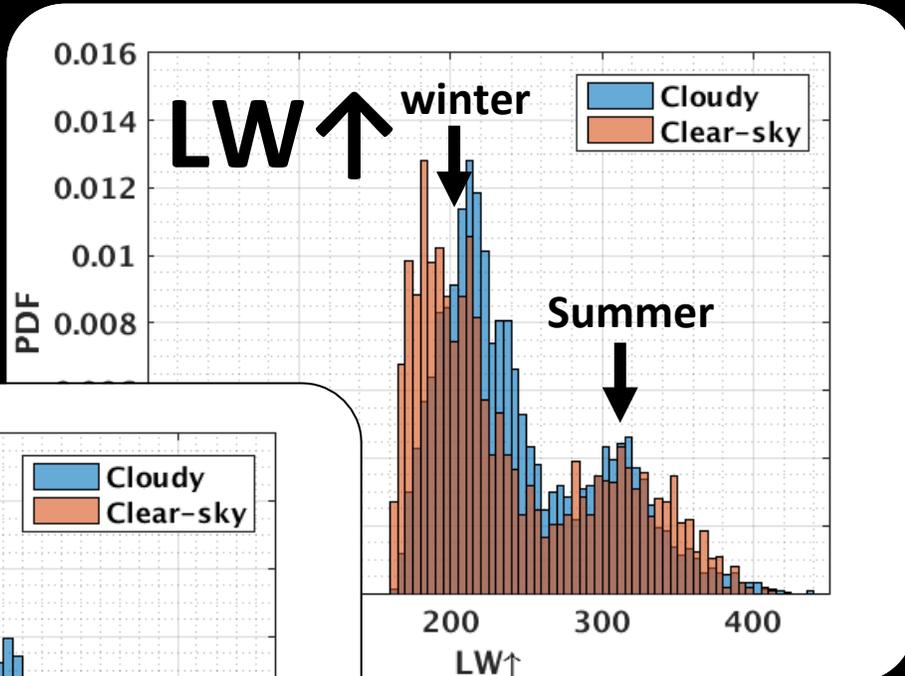3. Ice clouds.
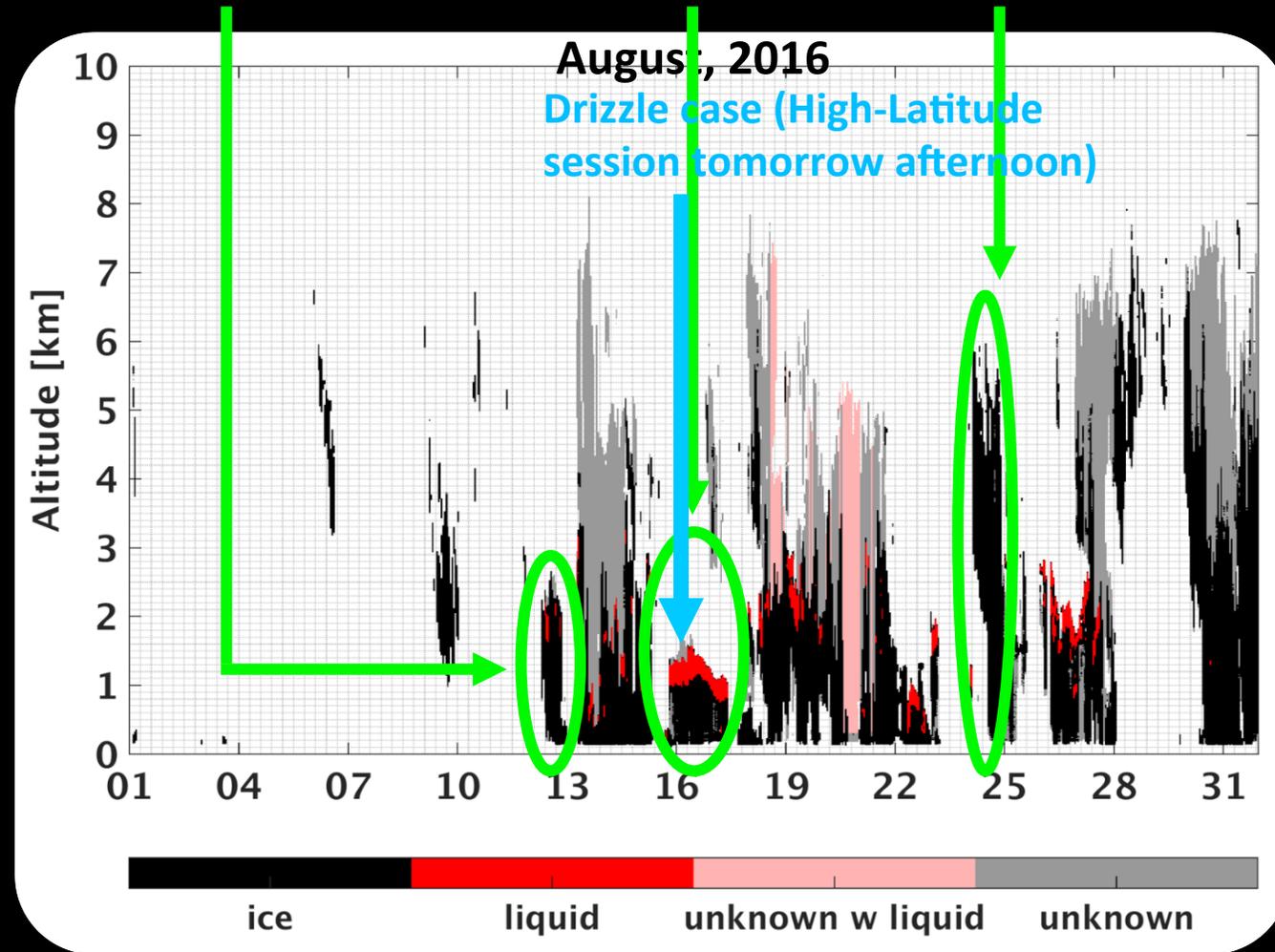
Silber et al., *JGR*, 2018

WAIS Divide
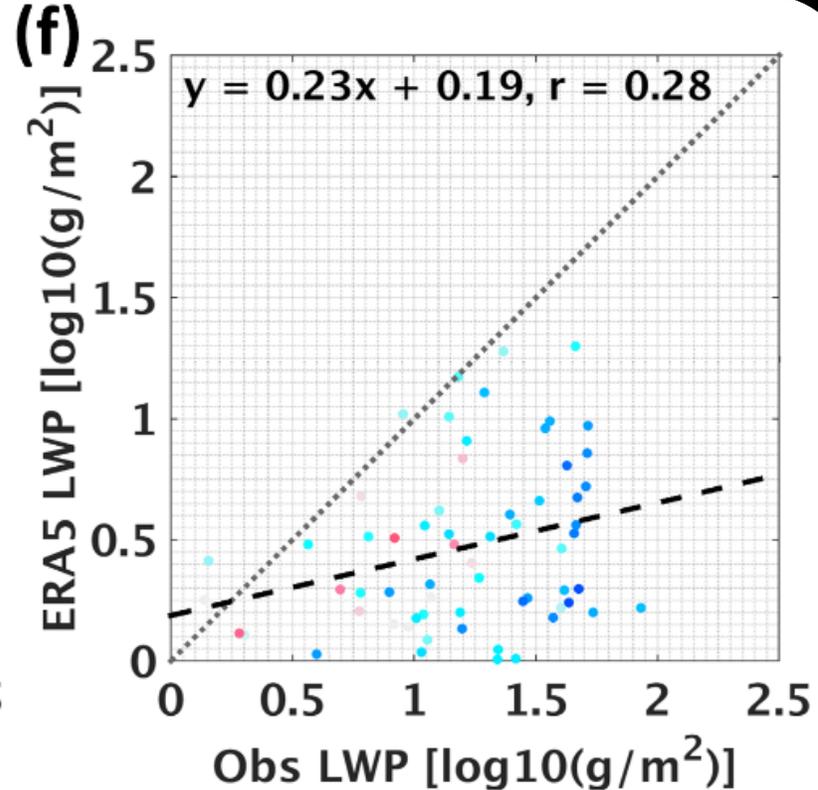
Sounding comparison
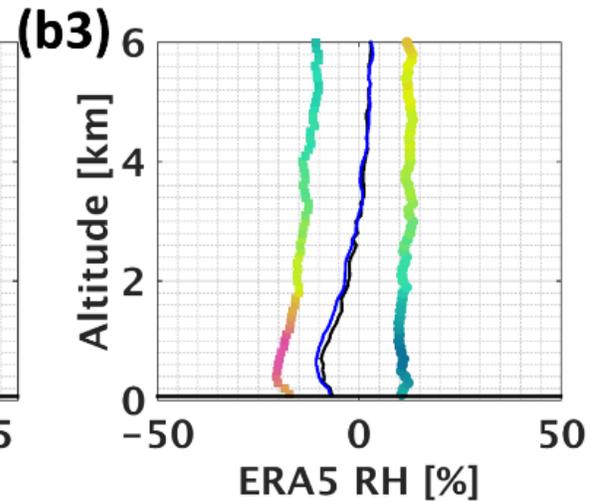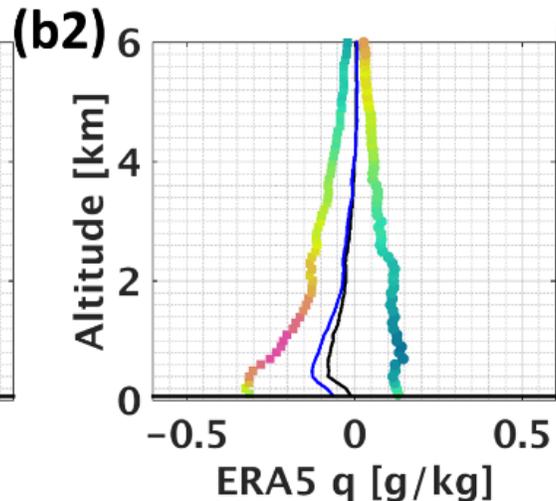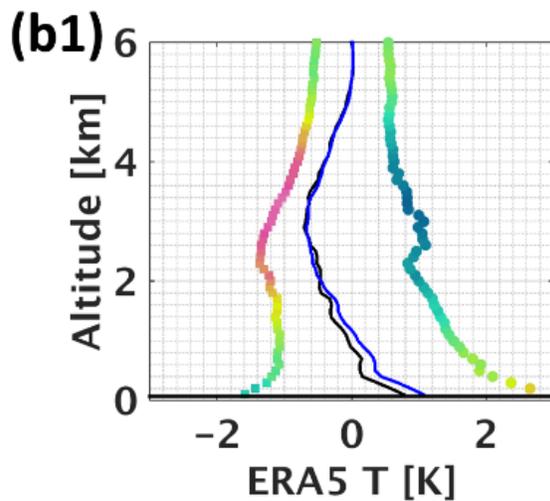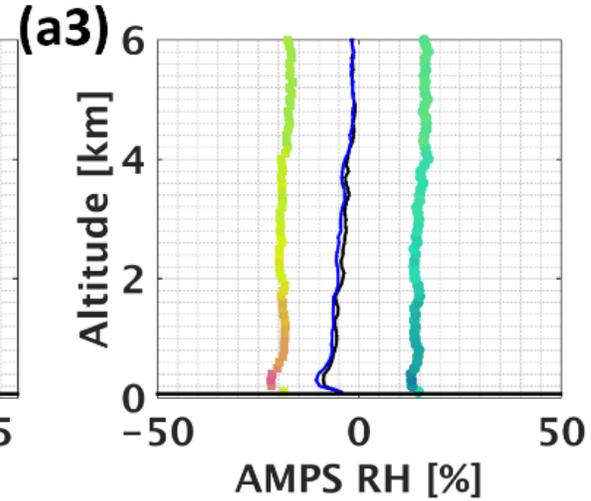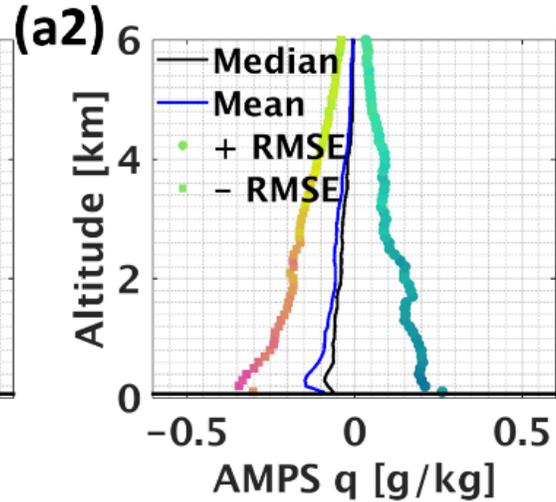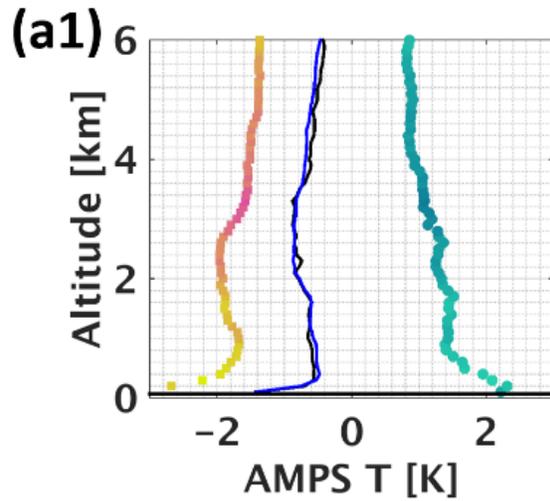
Modeled vs. Observed LW Radiation
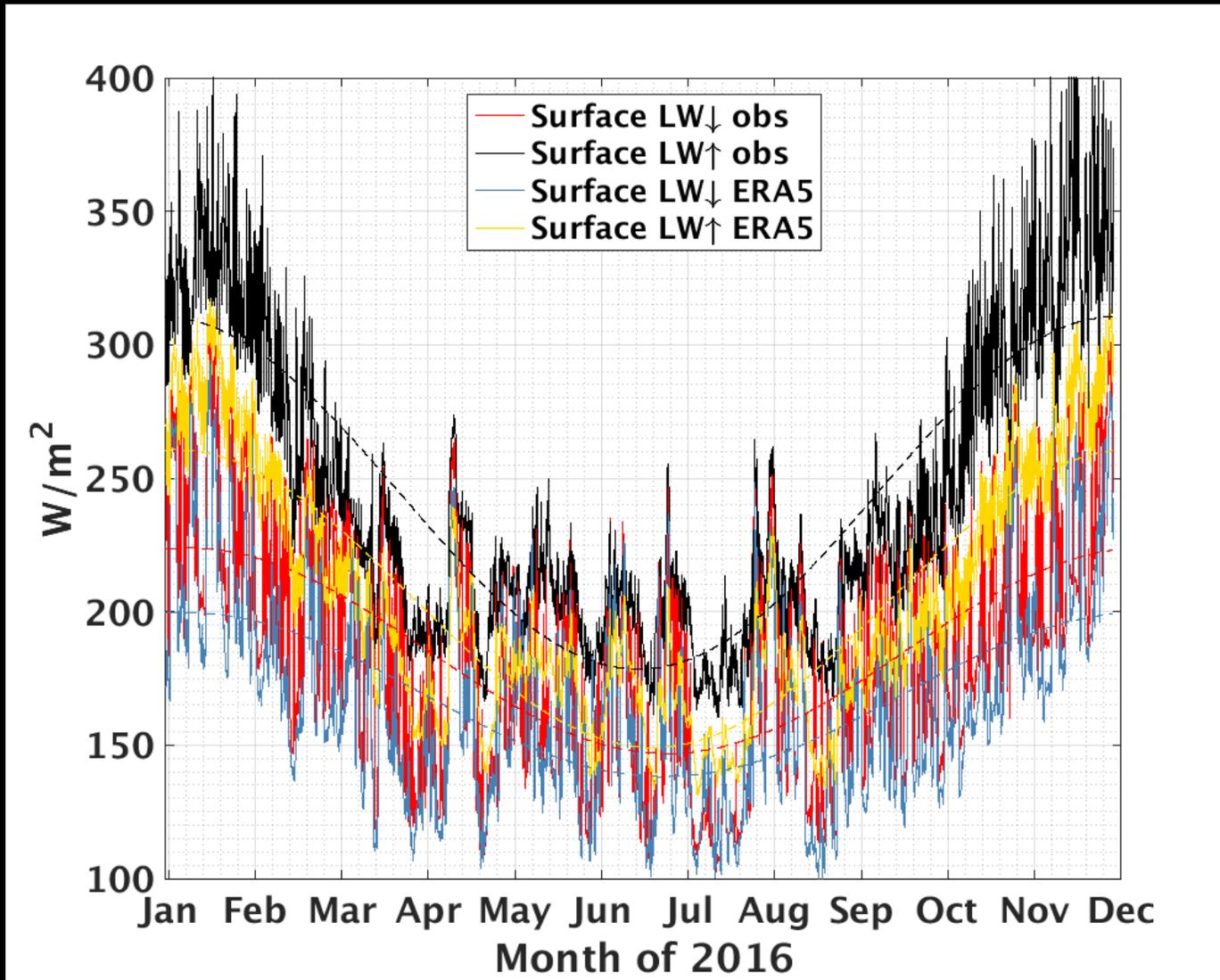
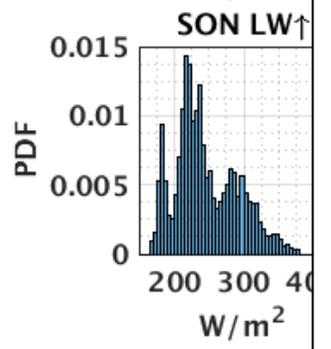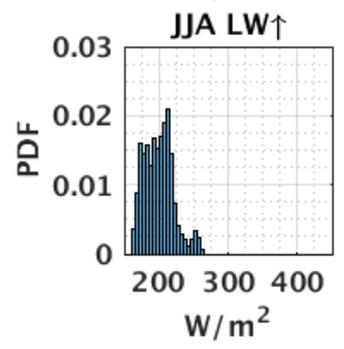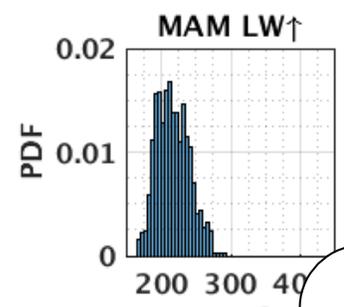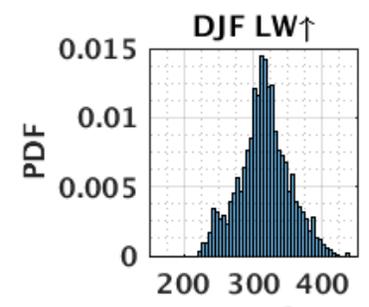# Lack of the Opaque Regimes in the Models
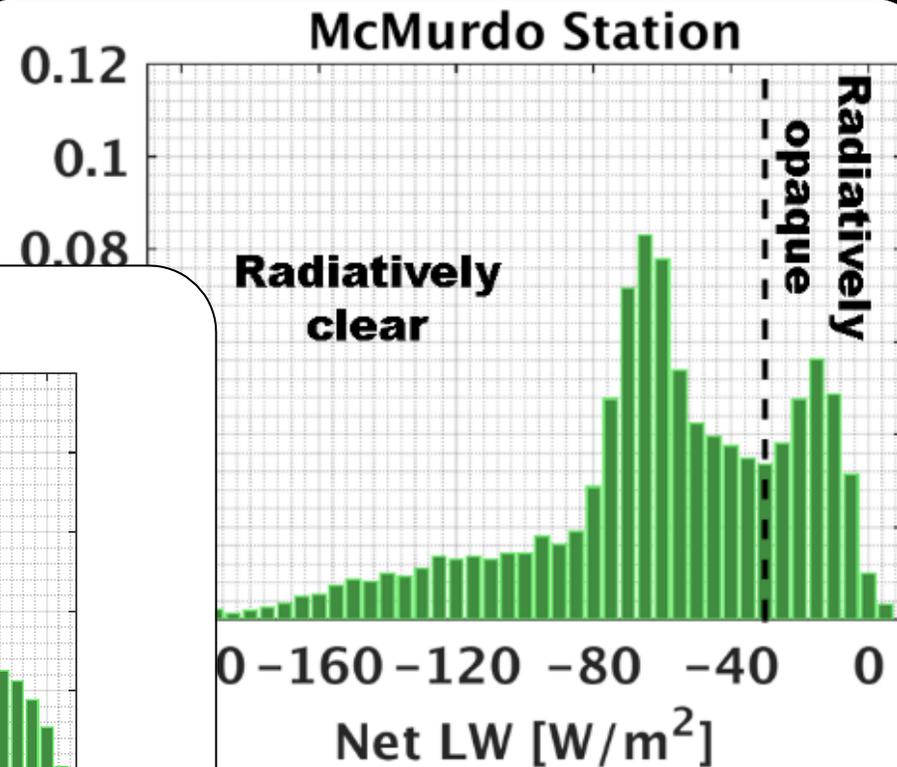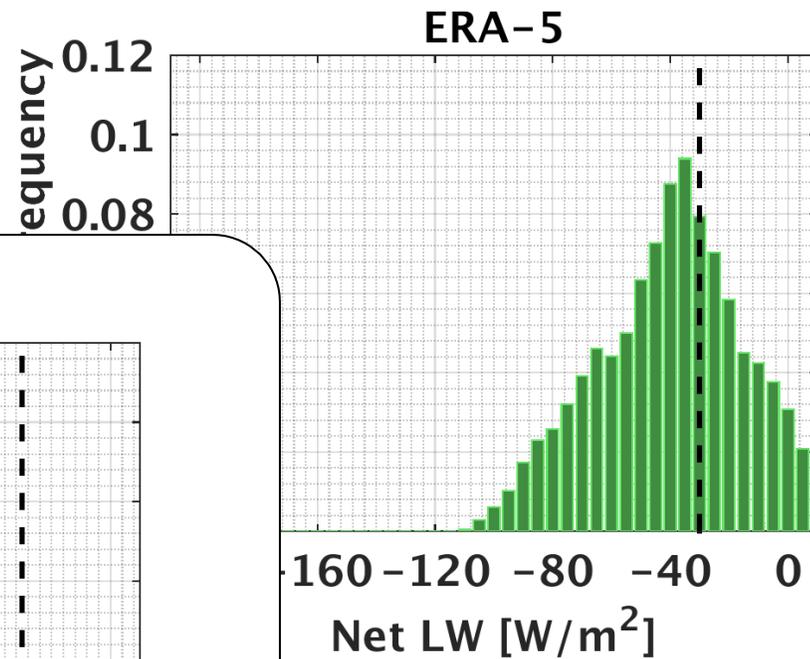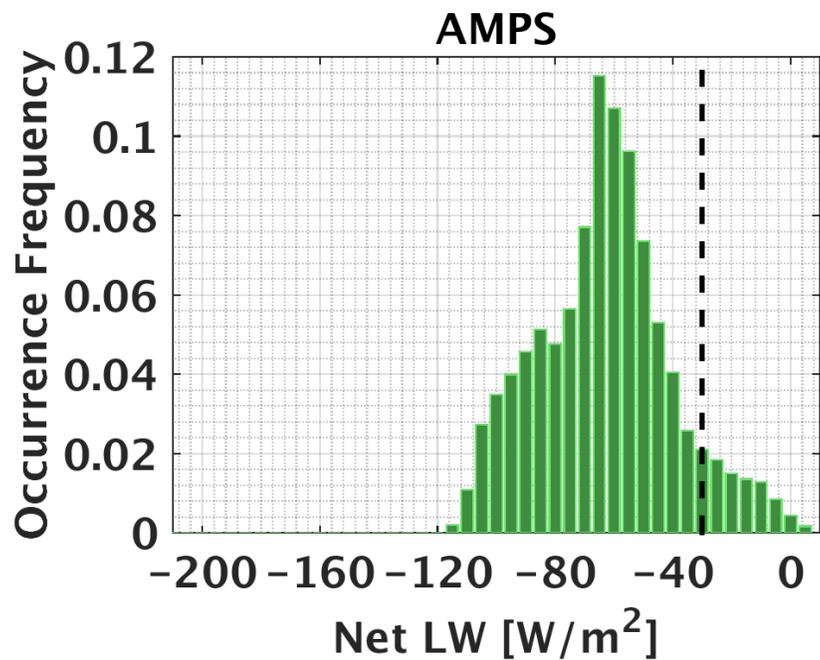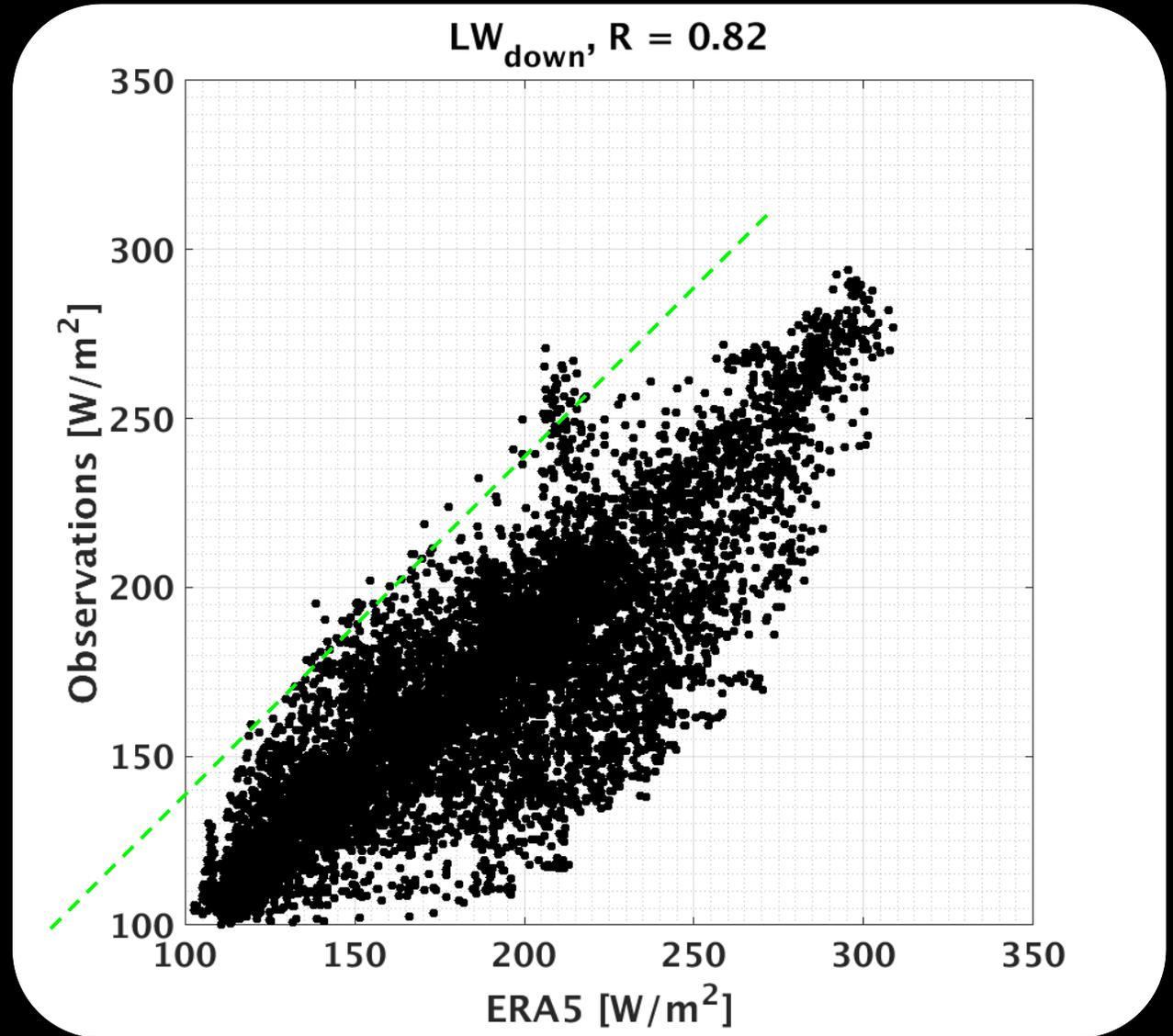
Cloudy vs. Clear-sky LW radiation
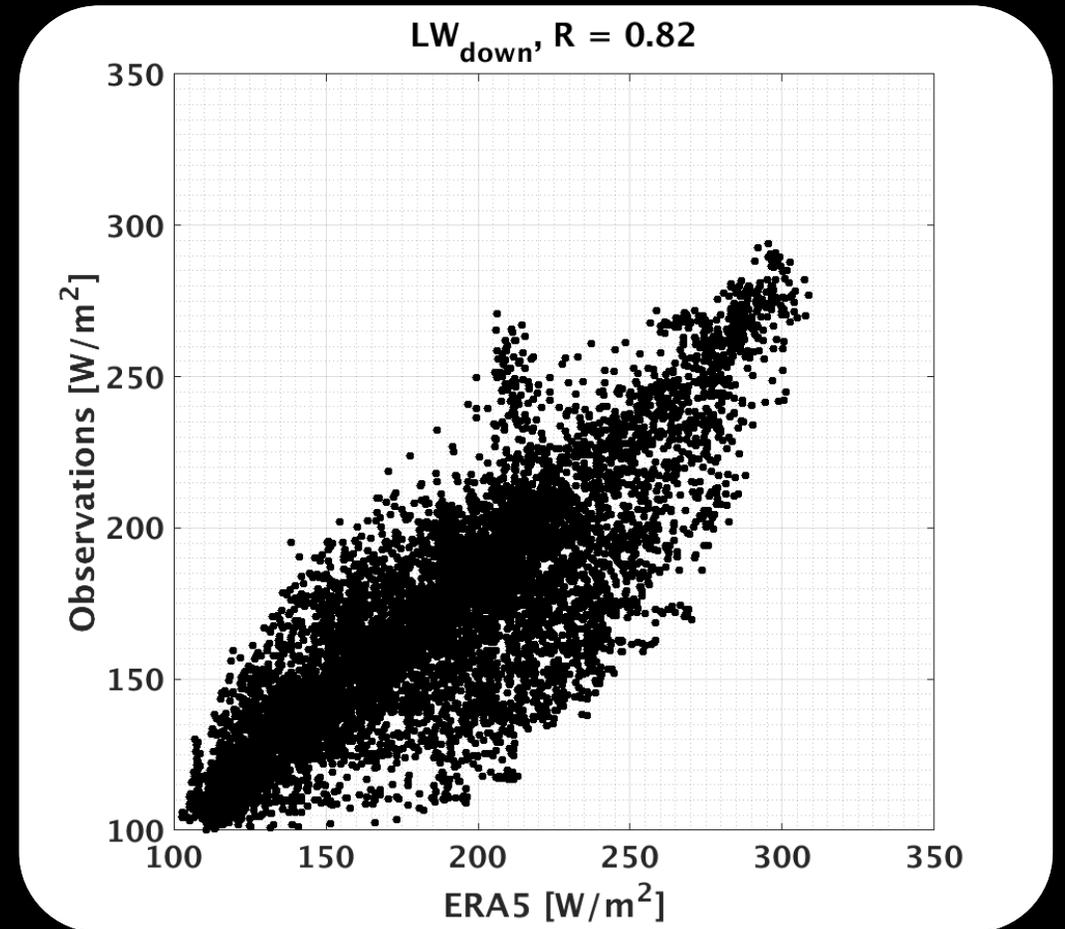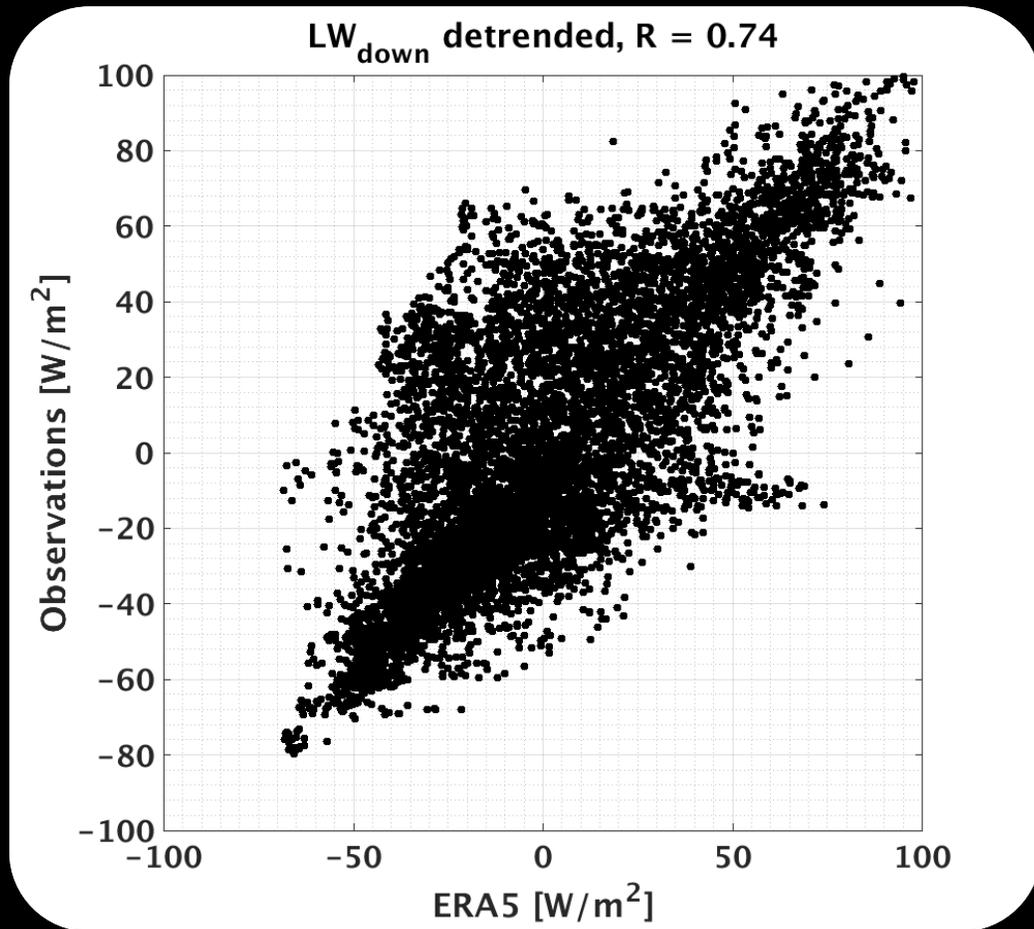
Seasonal Behavior
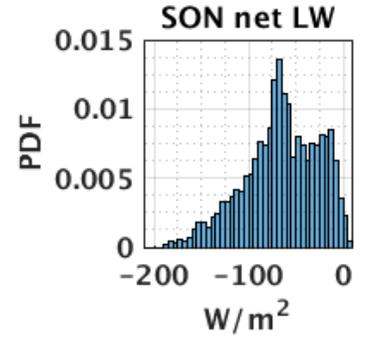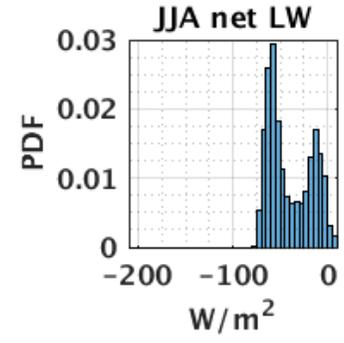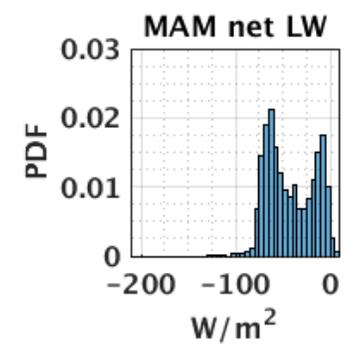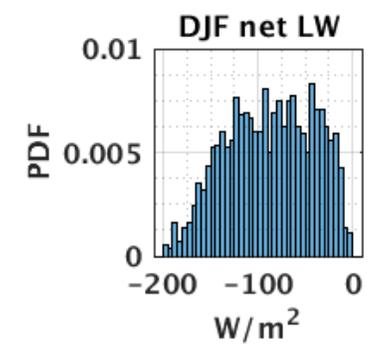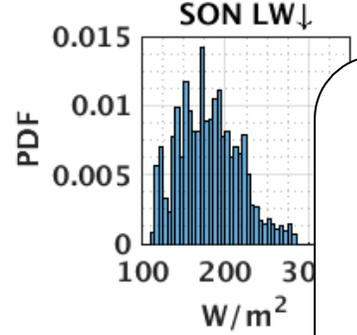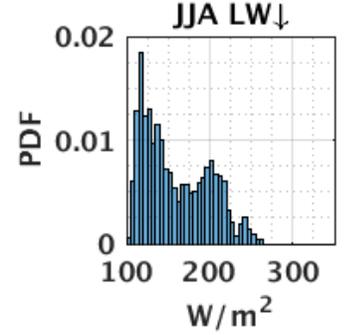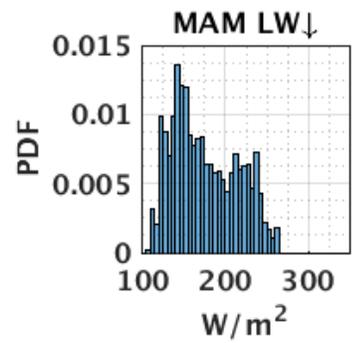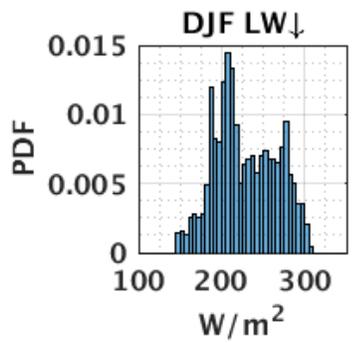
Modeled LW↓ Bias

Note: on an annual perspective, the models do provide a reasonable performance!

Modeled vs. Observed Downwelling LW

Modeled vs. Observed Downwelling SW

SW$_{down}$ detrended, R = 0.69

SW$_{down}$, R = 0.75