



Update on Cloud Modeling Data Products for CLWG

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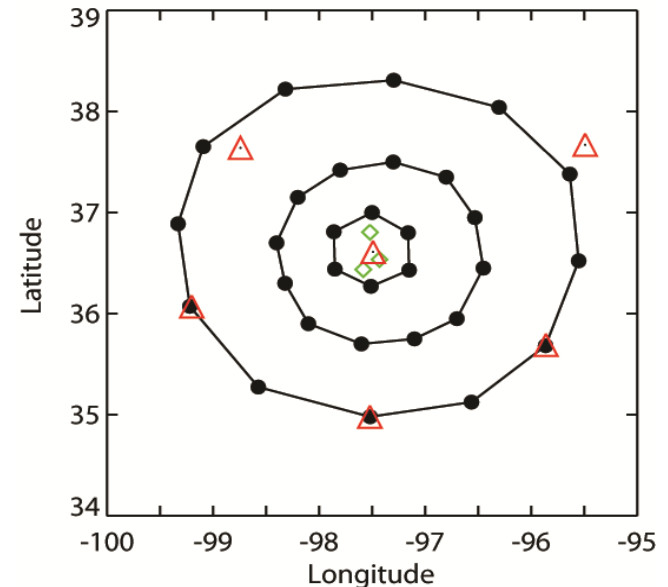
Acknowledgments

Renata McCoy, Yunyan Zhang, Chuanfeng Zhao, Steve Klein, Minghua Zhang, Xiquan Dong, Baike Xi, other ARM infrastructure teams and relevant PIs

Data Released

- **Large-Scale Forcing Dataset**
 - Forcing for MC3E over three different domains with 300x300km, 150x150km, and 75x75km
 - Ensemble Forcing for AMF-China
- **ARM Best Estimate Dataset (former CMBE)**
 - Updated with more quantities
 - Clear sky surface radiative fluxes – effective cloud albedo to quantify the surface SW impact of clouds.
 - ECOR surface latent and sensible fluxes
 - Available on ESG for CMIP5
 - OBS4MIPs
 - CFMIP5

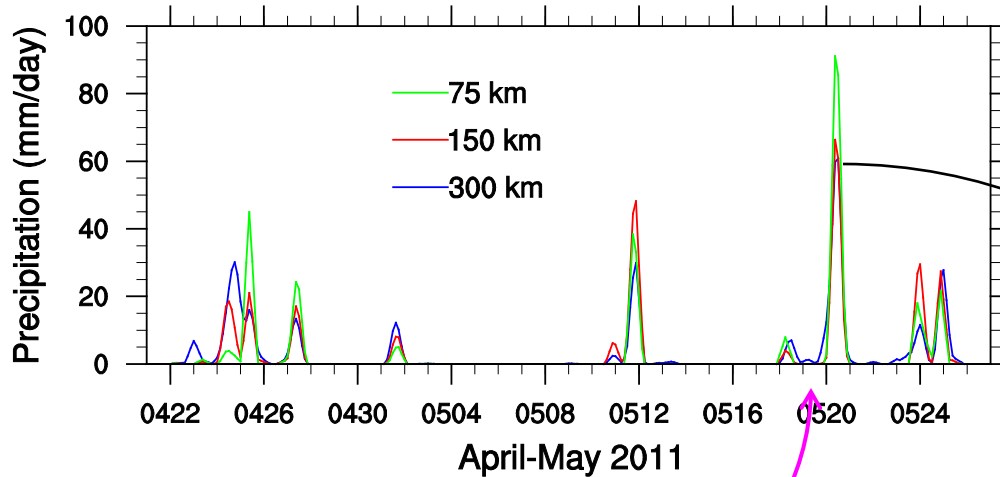
Multi-Scale Domains



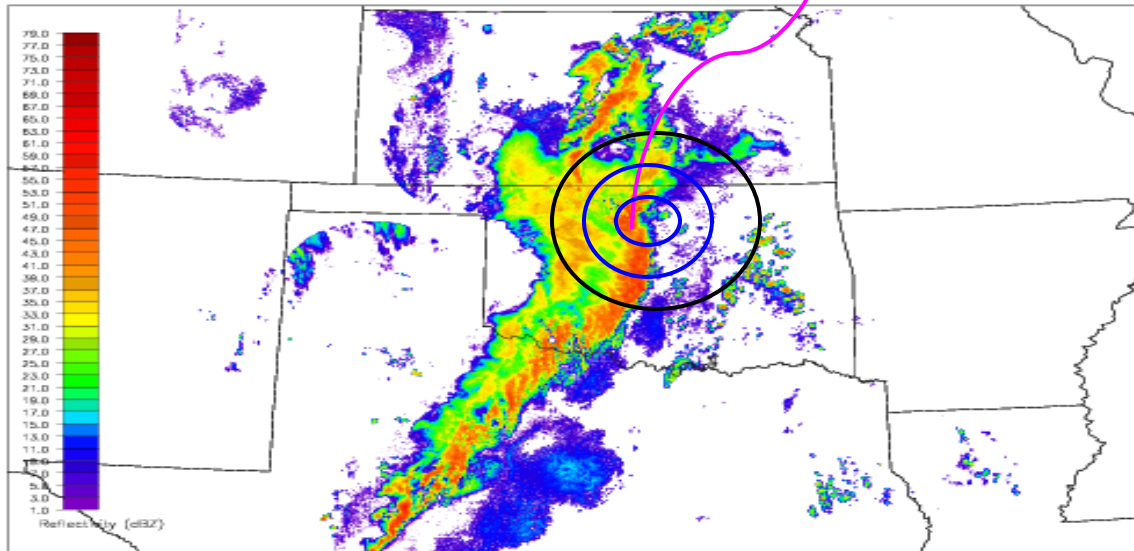
Forcing varies with domain sizes

The 20 May 2011 Strong Mesoscale Convective Case

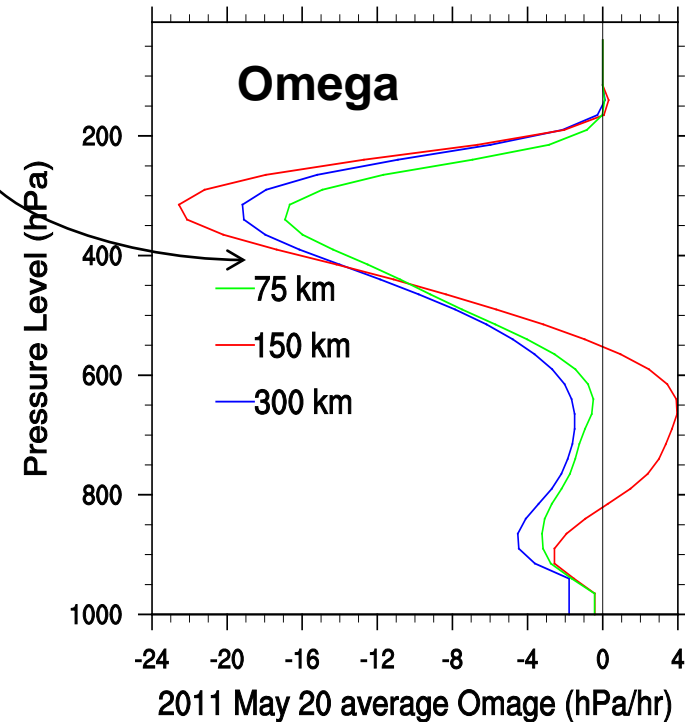
Surface Precipitation Rates



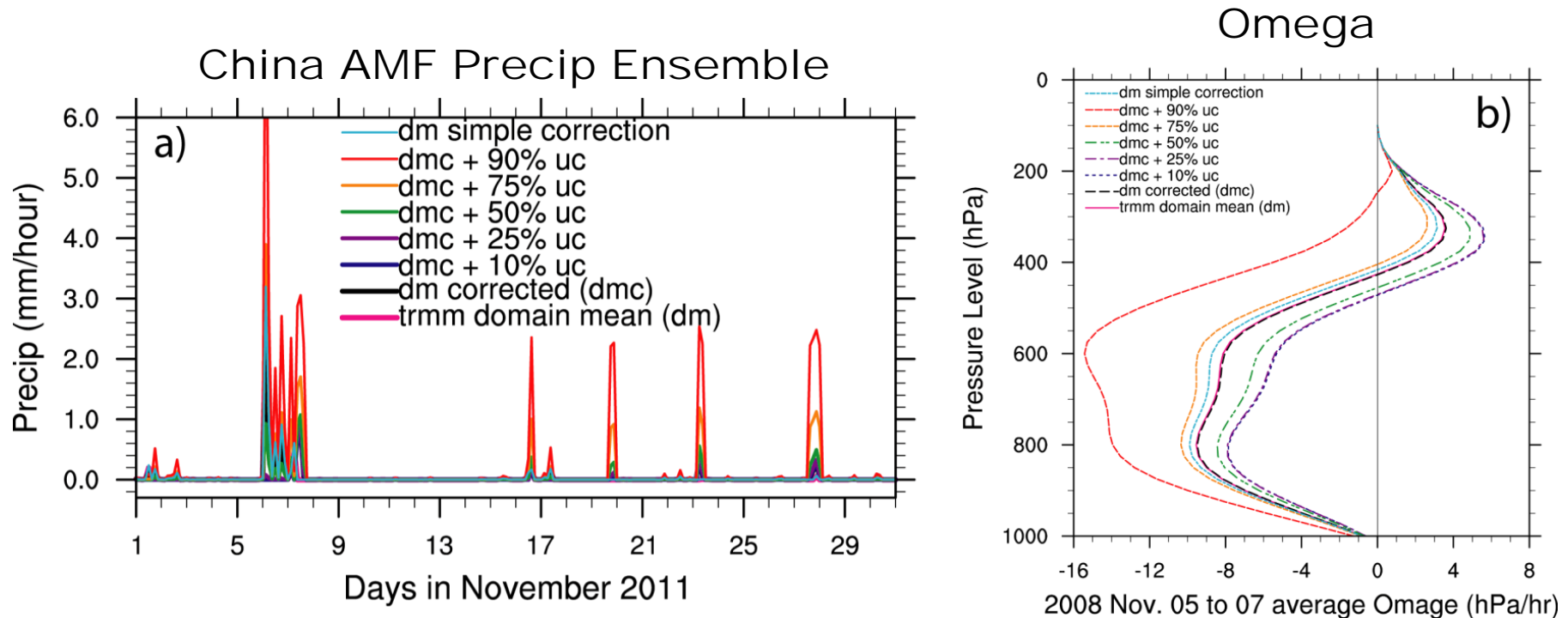
20110520 1000 UTC 2.0 km



CLIMATE RESEARCH FACILITY



China AMF Ensemble Large-scale Forcing (0Z 1 Nov. 21Z 30 Nov 2008)



- **MERRA-reanalysis based ensemble forcing by perturbing surface precip**
- **An ensemble precipitation rates based on one surface rain gauge and 3-hourly TRMM data. Uncertainty estimate for different weather conditions and apply the mean error to correct TRMM domain mean data.**
- **Address the uncertainty range from 60% (underestimated case) to 190% (overestimated case) compared with corrected domain mean data**

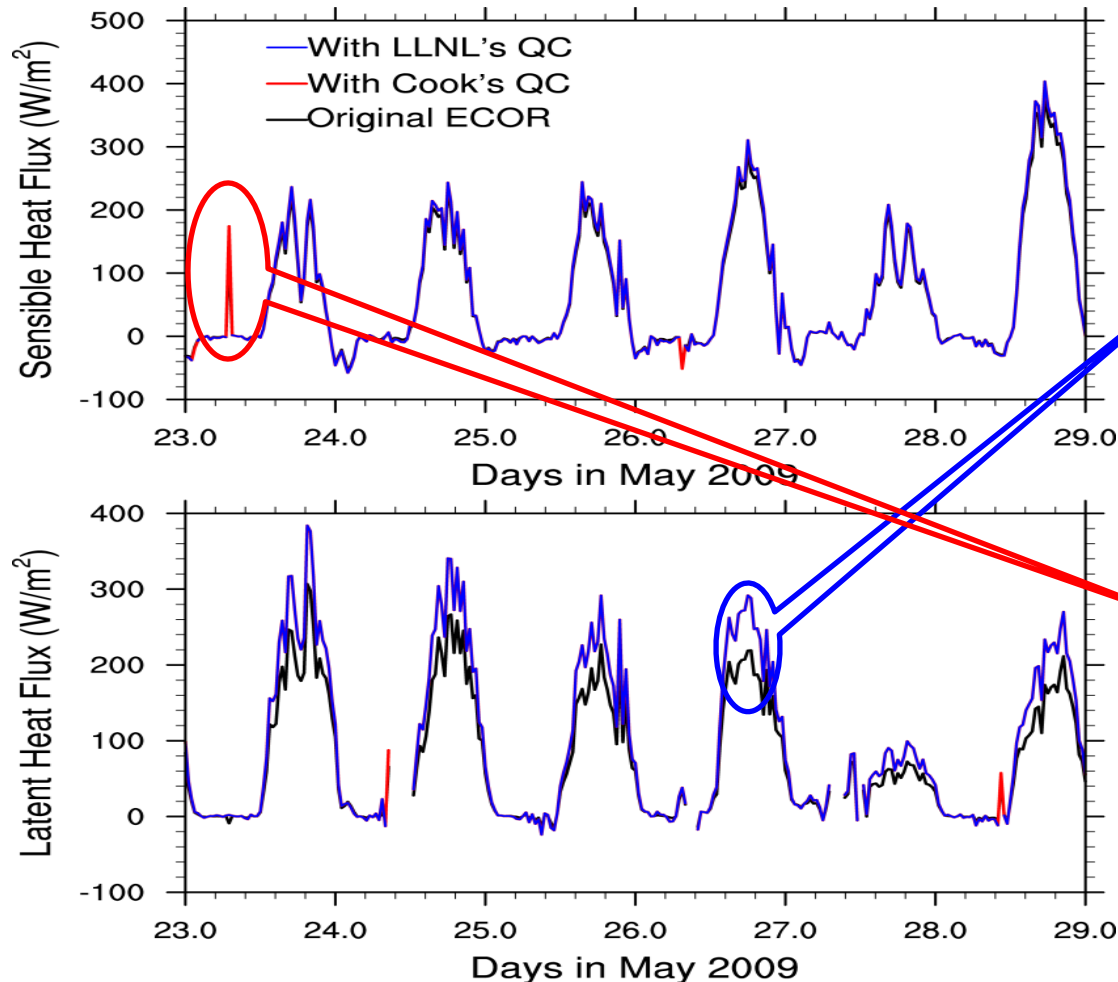
Ongoing work/in the near future

- **Best Estimate ECOR VAP**
- **Large-scale forcing development**
 - **Ensemble forcing for MC3E**
 - **Forcing for AMIE**
- **Enhancement of ARMBE**
 - **ARMBE - LAND**
 - **ARMBE – RIPBE**
 - **ARMBE – AMF Sites**
- **ACRED - 9 different retrievals at all 5 ARM sites for multi-years have been released last fall**
 - **Adding more cloud properties to ACRED**
 - **Ensemble retrievals for MICROBASE and other selected retrievals**
- **High resolution ACRED for BBHRP**

Best Estimate ECOR VAP

Yunyan Zhang (LLNL) and David Cook (ANL)

Data Sample at SGP Central Facility



Original ECOR



Cook's corrections

Corrections related to stability, Webb-Pearman, frequency, sensor separation, filtering, line-averaging and volume-averaging, commonly increase the latent heat flux by 10 to 30 % and sensible heat flux by 10 % from the raw data, especially during the daytime while much smaller increase during nighttime.



LLNL's Quality Control

Checks on Data range (max and min), Outliner (standard deviation), Temporal Variability (moving window method) to remove suspicious data



BEECOR VAP

Will apply these QCs to the new ECOR systems at SGP, TWP, and NSA sites

Thank You

Comments and Questions?