Diurnal Cycle at the ARM SGP Site

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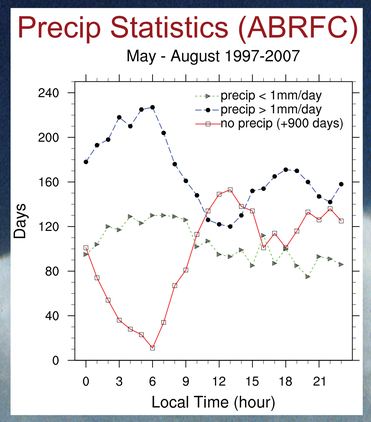
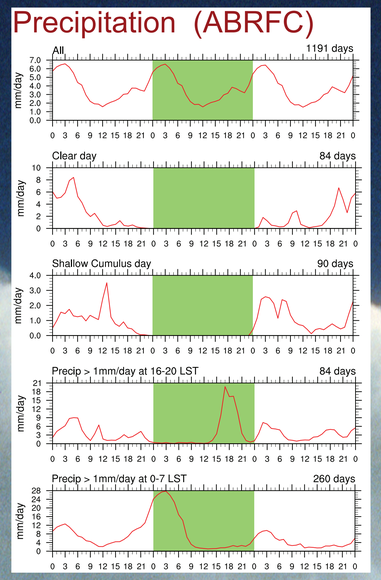
Motivation

1. What can we learn on the diurnal cycle of summertime convection over land from long term observations at Atmospheric Radiation Measurement (ARM) Southern Great Plain (SGP) stie?
2. What conditions favor fair-weahter shallow cumulus (non-precipitating shallow convection)?
3. What conditions favor deep convection with heavy precipitation in the afternoon?

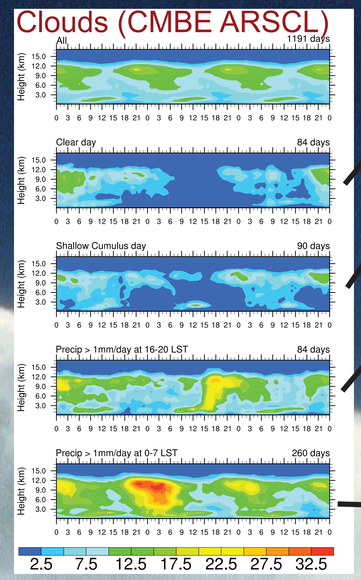
Precip Statistics (ABRFC)



Precipitation (ABRFC)



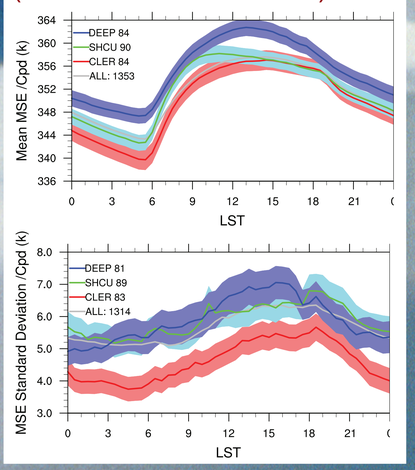
Clouds (CMBE ARSCL)



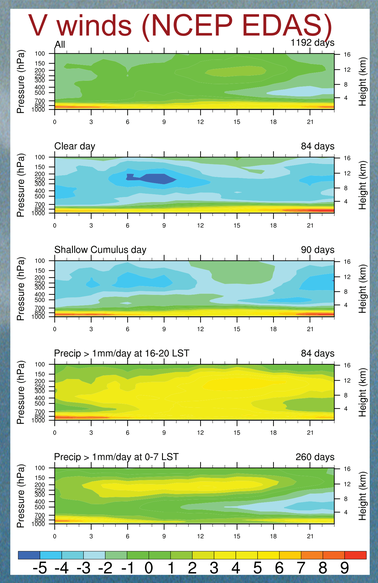
Diurnal Composites

1. Clear day: precip(i) = 0, i = 0,24; tcld(i) < 5%, i = 8,15
2. Fair-weather Shallow Cumulus: precip(i) = 0, i = 0,24
   overlap with Larry Berg (2008) shallow cumulus days
3. Late afternoon Deep Convection: precip(i)>1mm/day,
   i = any of (16,20), and the maximum rainrate in the late afternoon is at least 2 times bigger than the maximum rainrate at any other time.
4. Nighttime Deep Convection:
   diurnal maximum precip(i)>1mm/d, i = any of (0,7) LST

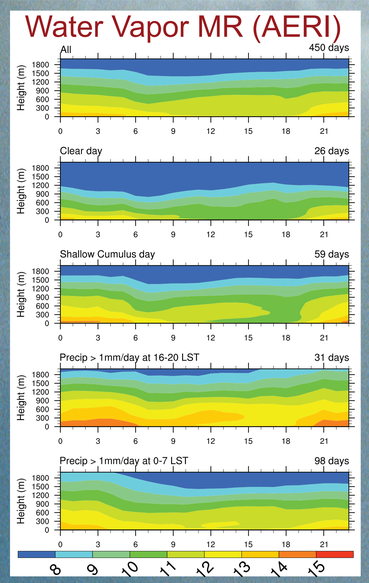
Surface Moist Static Energy (SMOS + OK mesonet)



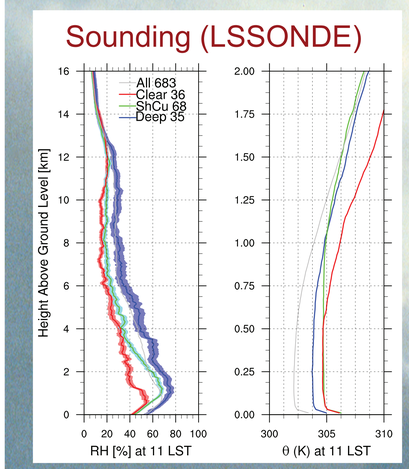
V winds (NCEP EDAS)



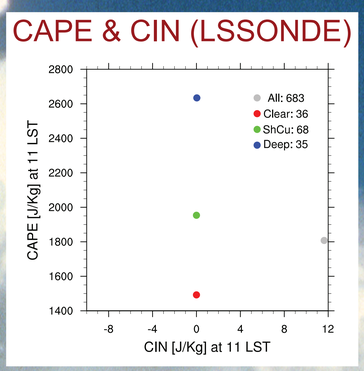
Water Vapor MR (AERI)



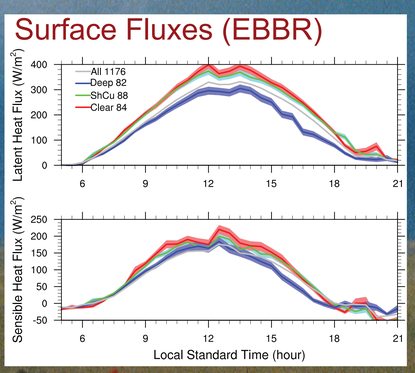
Sounding (LSSONDE)



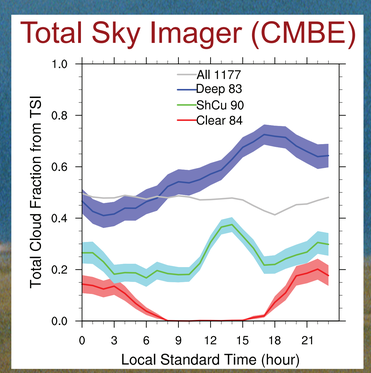
CAPE & CIN (LSSONDE)



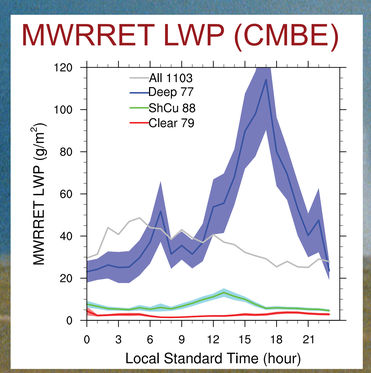
Surface Fluxes (EBBR)



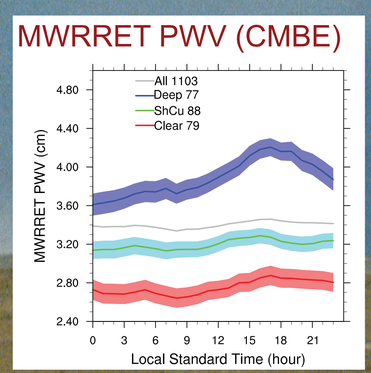
Total Sky Imager (CMBE)



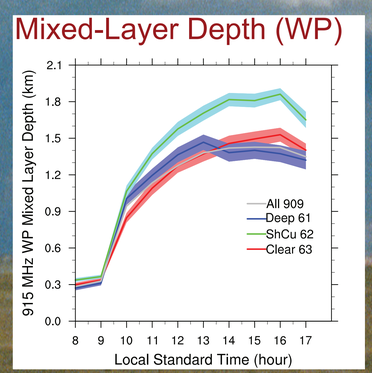
MWRRET LWP (CMBE)



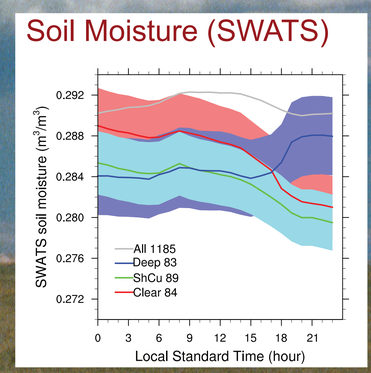
MWRRET PWV (CMBE)



Mixed-Layer Depth (WP)



Soil Moisture (SWATS)



Acknowledgement

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