

On SGP Summertime Shallow Cumulus

Yunyan Zhang & Steve Klein

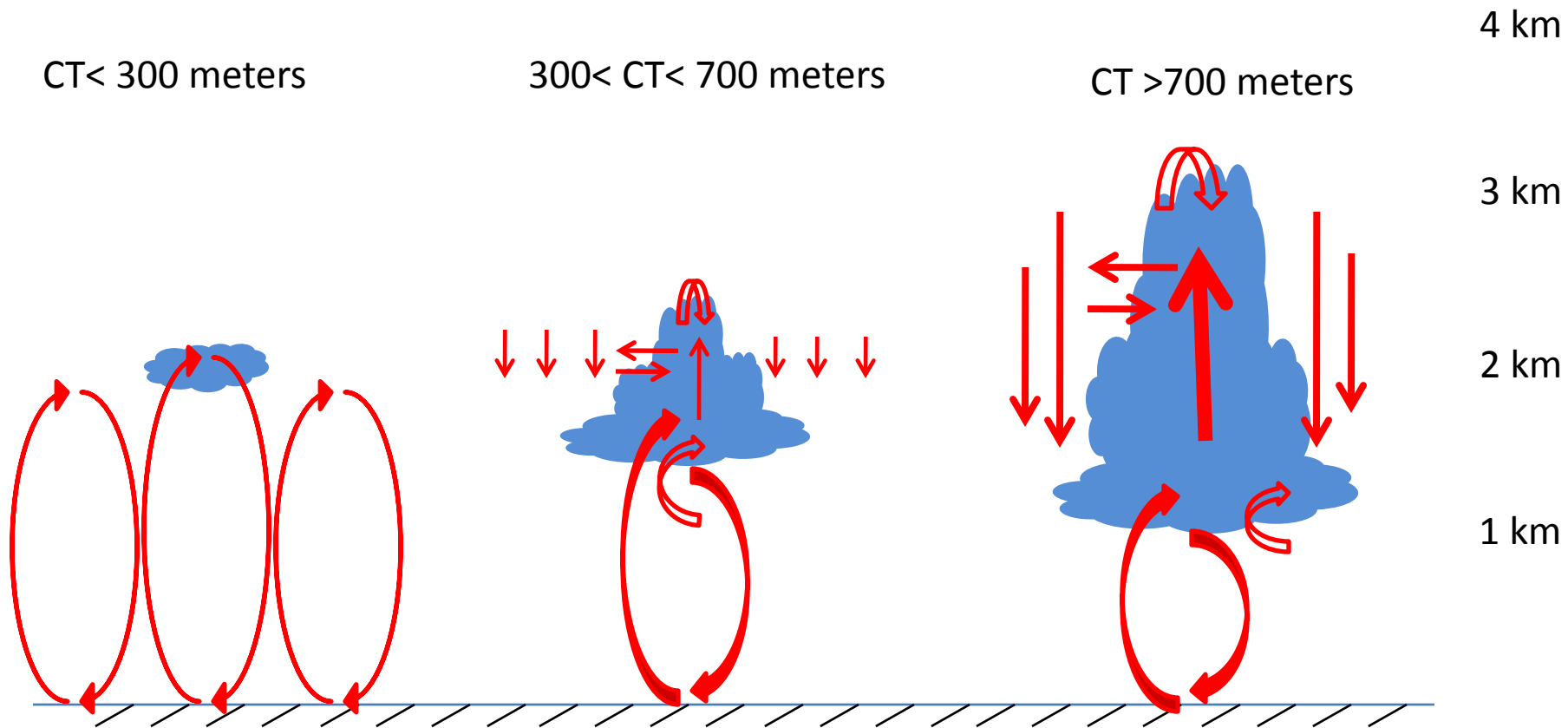
Lawrence Livermore National Lab

The first science team meeting of the Atmospheric System Research

Vertical Velocity Breakout

3/15/2010, Bethesda, Maryland

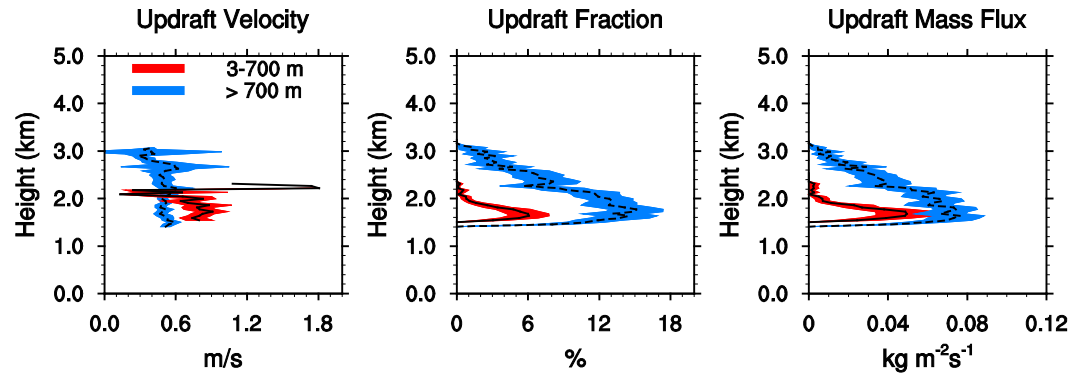
Group shallow cumulus cases based on daily average cloud thickness



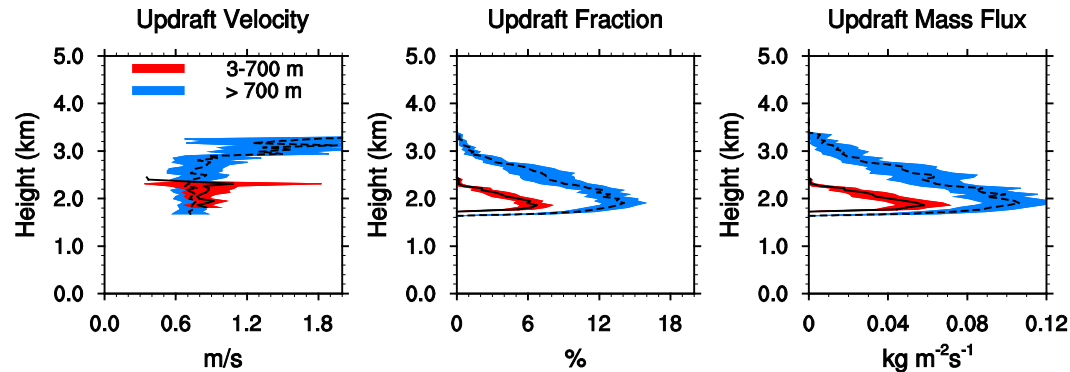
Dynamic features such as vertical velocity, updraft fraction and contributions to mass flux are expected to be different.

Comparison among groups

1130 Local Time



1430 Local Time



Based on 9-year 1-hour average MMCR vertical velocity data from Prof. Kollias.
The data analysis do not correspond to our conceptual model very well.
Details on other fields please refer to our poster on Tuesday

Our concern lists...

- Possible underestimation from thinner clouds
 - The first group is short of cases for composite
 - In each of the other two groups of deeper shallow cumulus, contribution from thinner clouds during diurnal variation or within one-hour average needs examination
- Some possible effect from insects to blur the boundary, such as cloud top?

Our wish lists...

- High resolution data will be helpful to establish cloud cases with different thicknesses and sizes, and to evaluate contribution to mass flux from different thicknesses and different cloud sizes
- Dual radar retrieval data (MMCR+WACR) will be helpful to resolve the insect concern (Pavlos)
- Velocity and liquid water collocation data will be helpful to evaluate $w'q'$

Future work

- We are setting up ideal composite cases for LES/SCM studies. Focusing on shallow cumulus cases at SGP, including the transition case from shallow to deep convection.
- Good observation of vertical velocity are wanted and we are trying to decide the most useful obs statistics and analysis to validate and criticize LES/SCM models.