

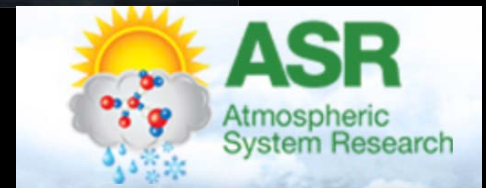
More than Hydrometeor Classification: What Polarimetric Radars Can Tell Us About Warm-Rain Processes

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DOE ASR Science Team Meeting
Radar Breakout Session
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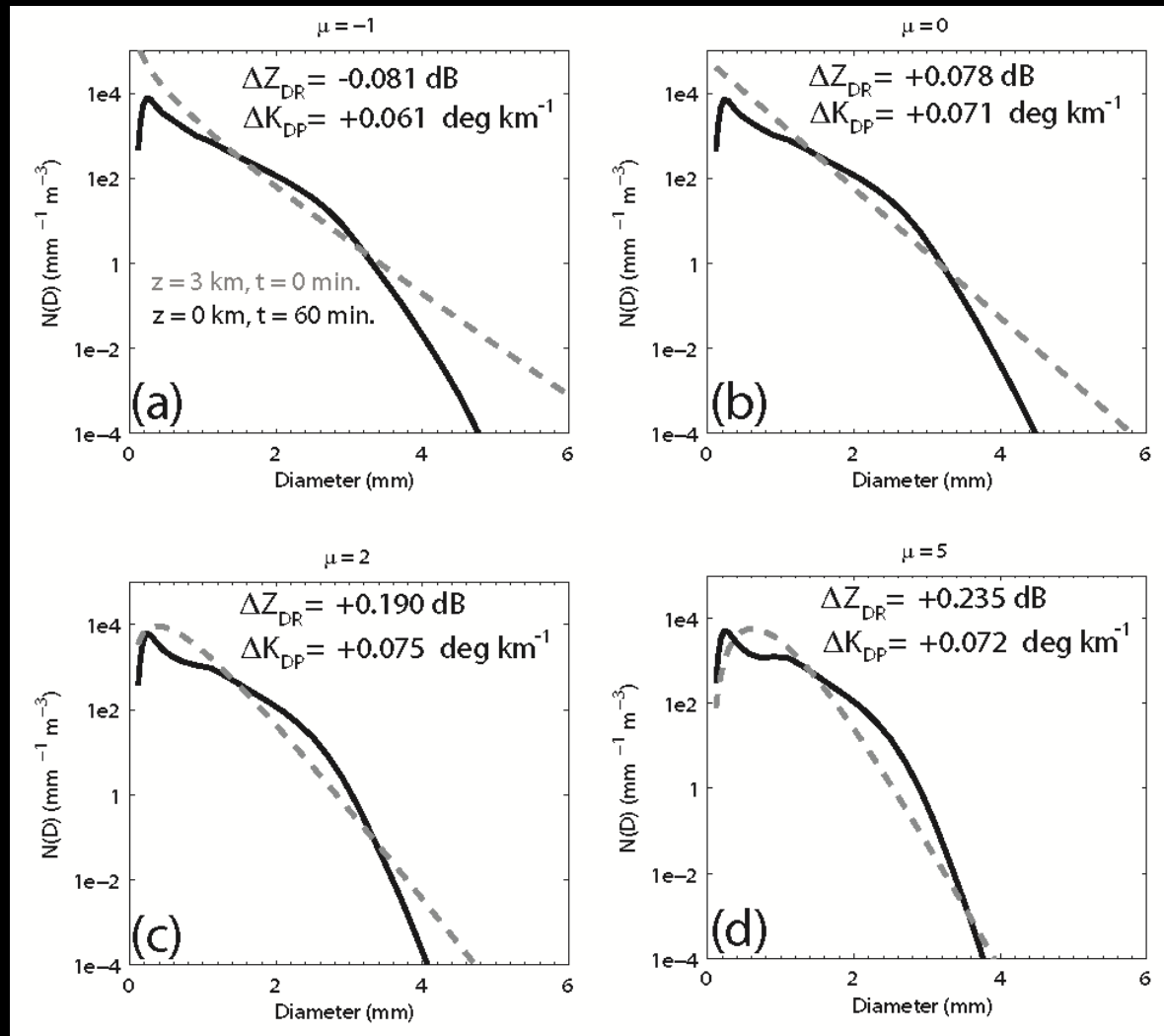
Warm-Rain Precipitation Processes

- Coalescence
- Breakup (collisional, aerodynamic)
- Evaporation
- Size sorting

Each of these processes affects the evolution of the DSD, *and thus (in principle) may affect the evolution and vertical structure of the polarimetric radar variables.*

Collisional Processes

Explicit bin model of Prat and Barros (2007a,b)

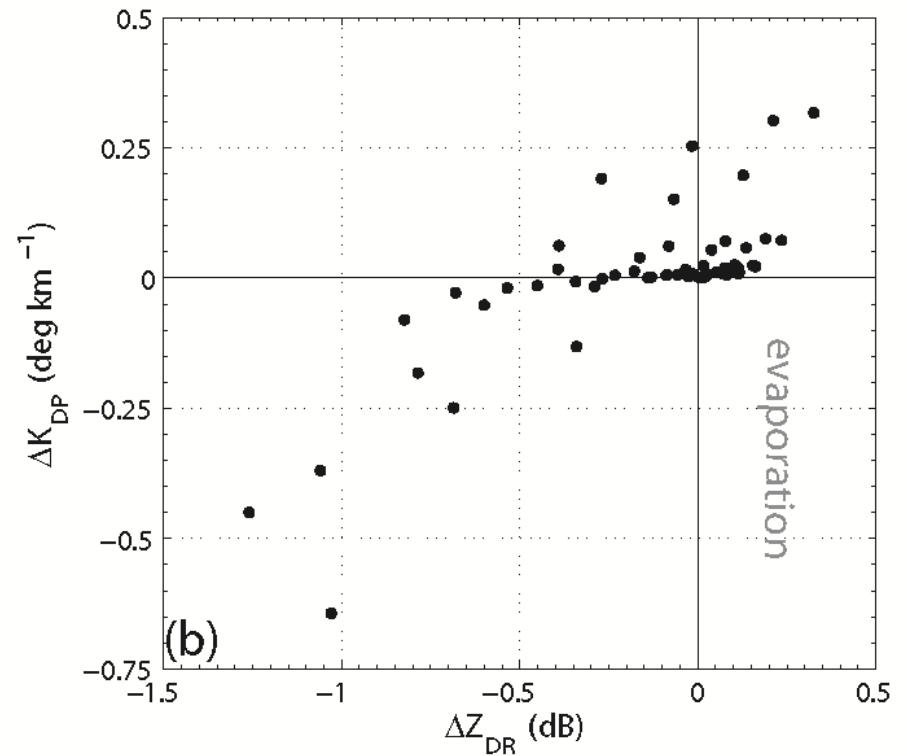
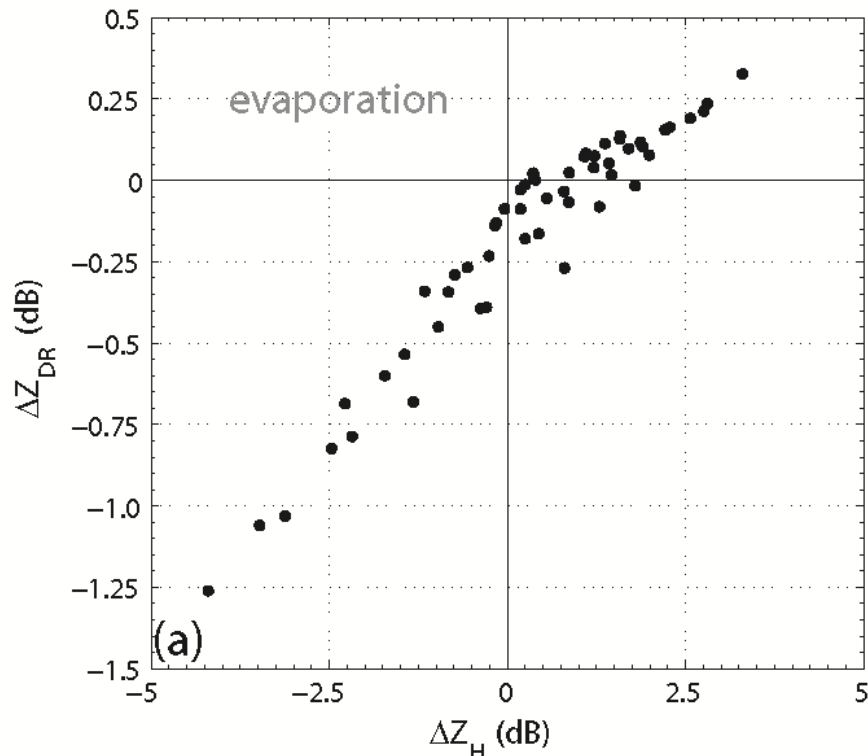


3-km rain shaft, simulation for 1 hour

Collisional Processes

Explicit bin model of Prat and Barros (2007a,b)

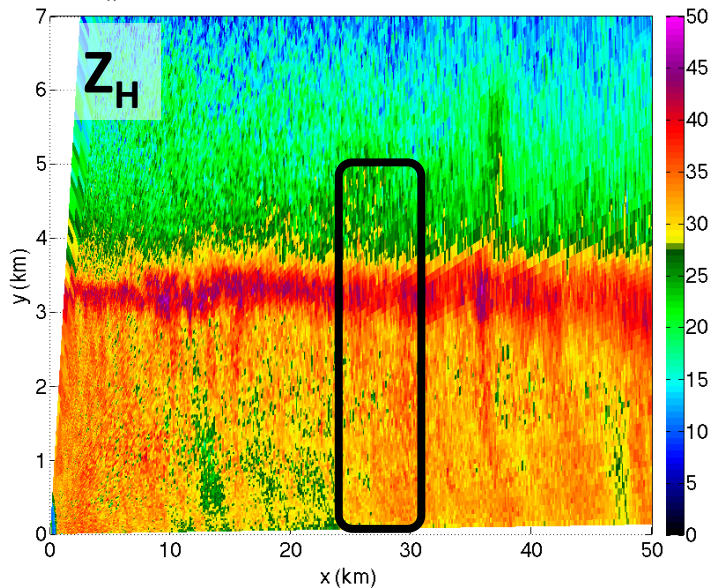
Change in dual-pol variables over 3-km rain shaft



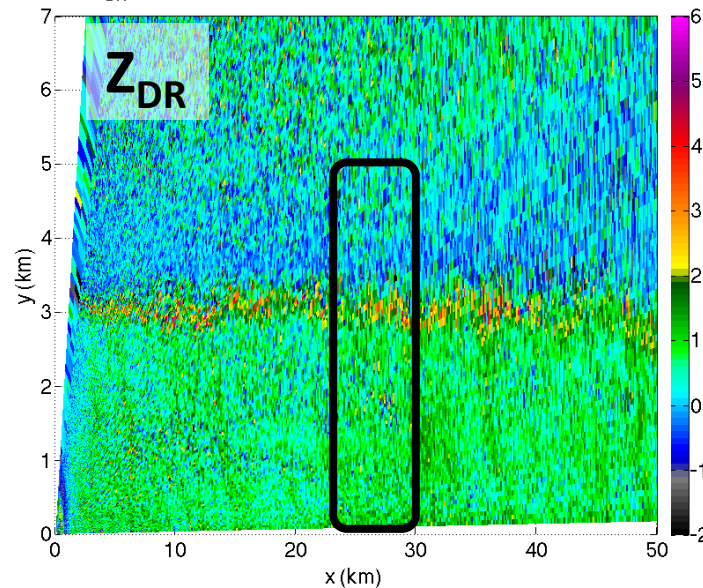
Different "fingerprints" for different microphysical processes

CSAPR Data – 20 May 2011

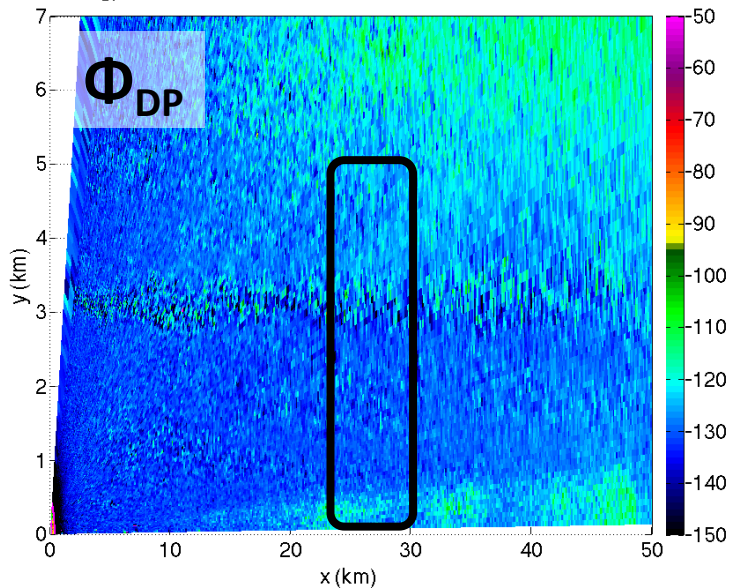
Z_H 187° ARM SGP C-SAPR 20110520.141742,0:19.7824 :



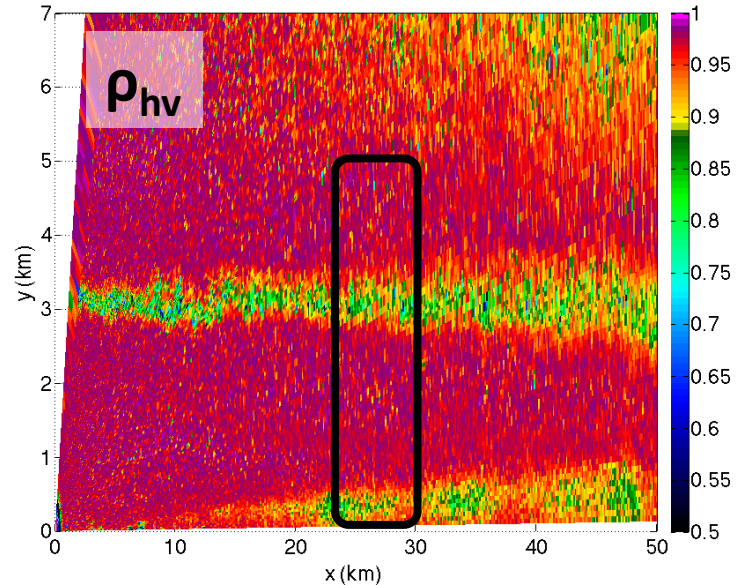
Z_{DR} 187° ARM SGP C-SAPR 20110520.141742,0:19.7824 :



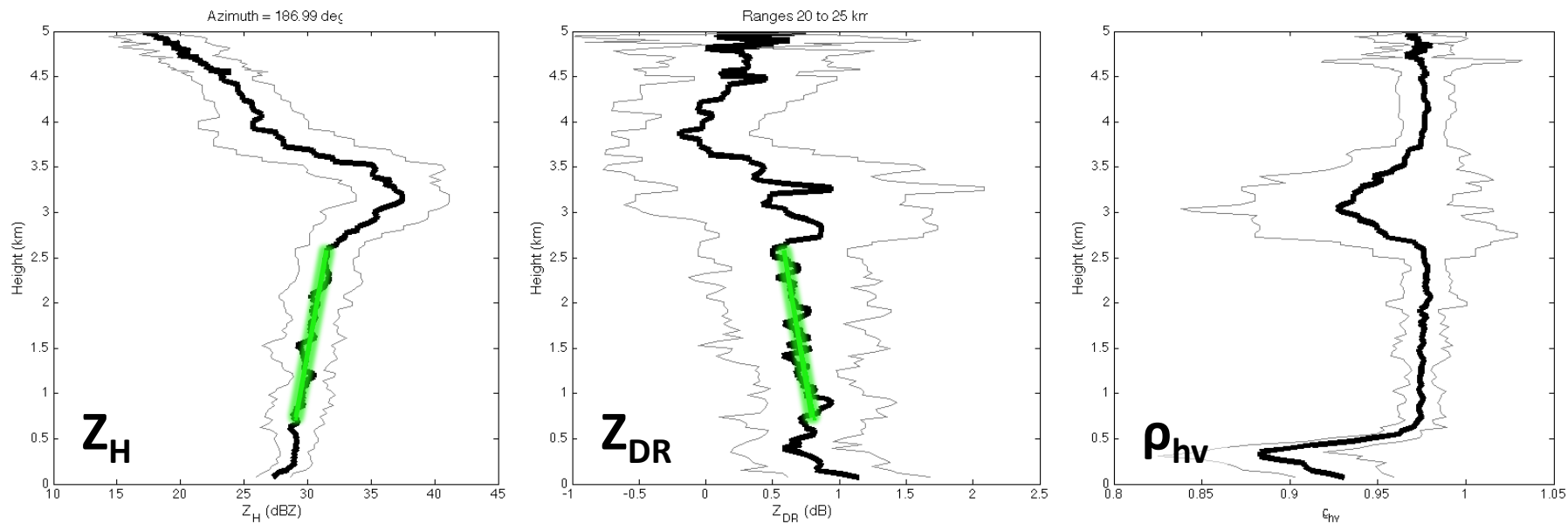
Φ_{DP} 187° ARM SGP C-SAPR 20110520.141742,0:19.7824 :



ρ_{hv} 187° ARM SGP C-SAPR 20110520.141742,0:19.7824 :

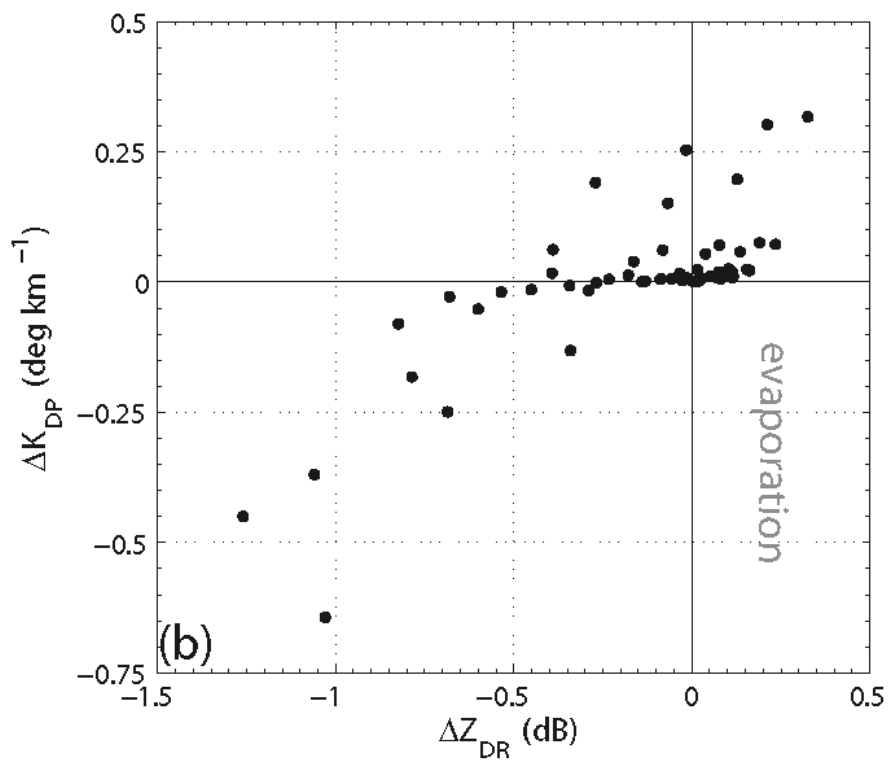
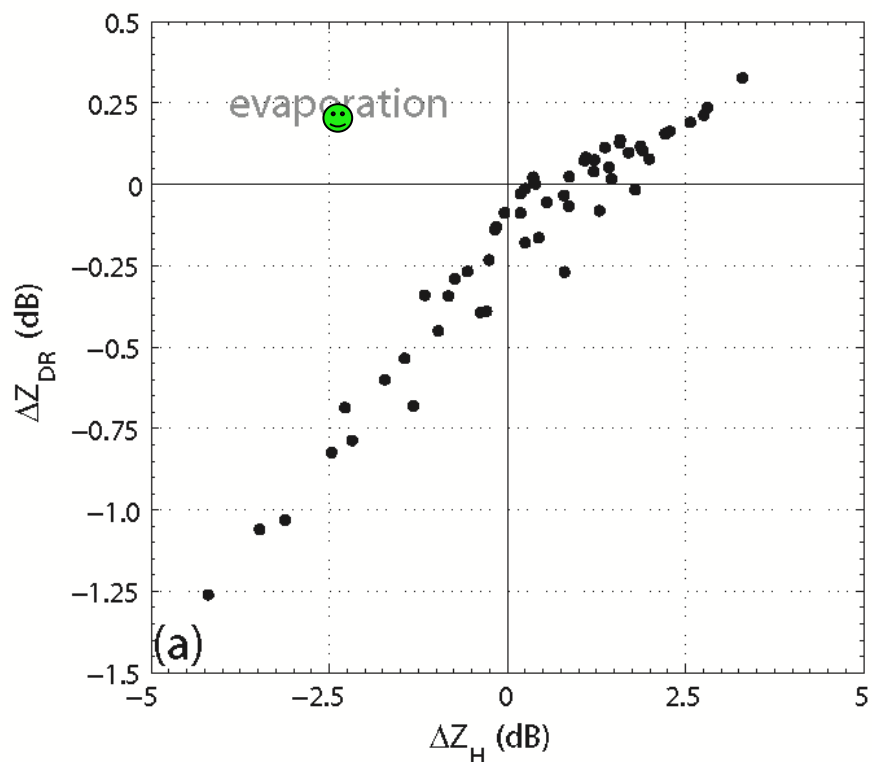


CSAPR Data – 20 May 2011



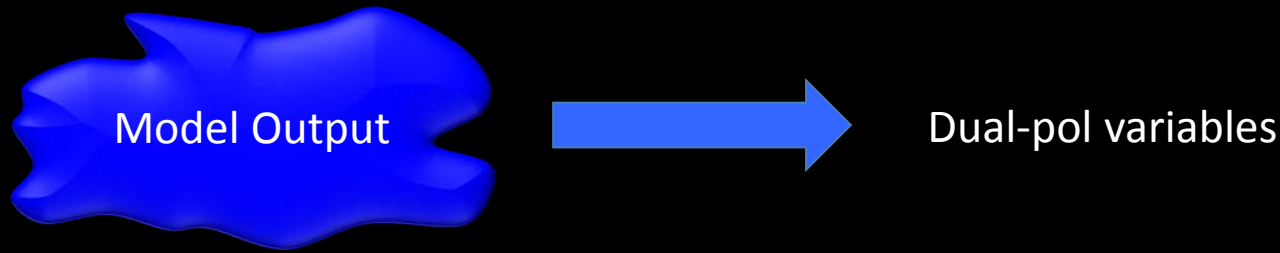
Median vertical profiles in 5-km window
(+/- 1 standard deviation)
Linear fit: VPR, VPDR?

CSAPR Data – 20 May 2011



Value for Microphysics/Process Studies

- Better understanding of the processes *in nature*
- Govern DSD evolution → precipitation rate,
evaporation and loading rates
scavenging rates
cloud life cycle implications
- Validation of bin models
- Validation of parameterization schemes



(Can be applied to any precipitation process)