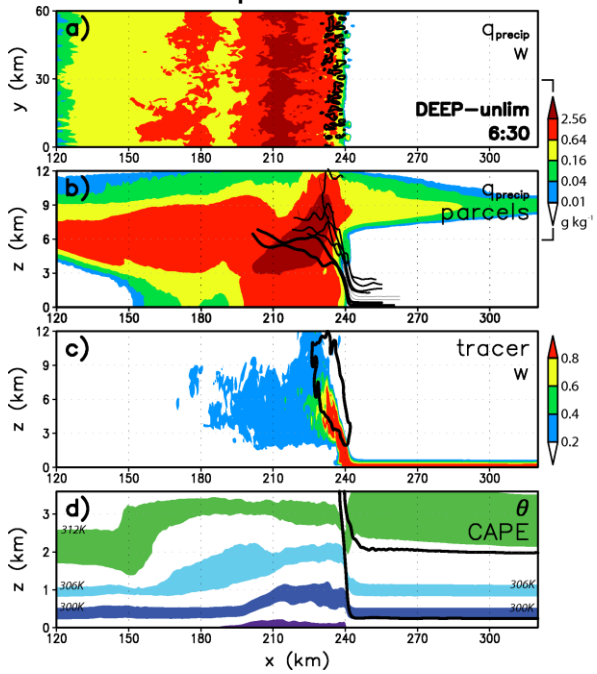
# Ziegler et al.'s research interests

- Specific aim: *Understand lower-tropospheric cold pool generation & outflow processes associated with nocturnal MCSs*
  - Origins and mechanisms for MCS cold pool formation & maintenance
  - Transition process from sfc-based to elevated convection & cold pool
  - Influence of stability & shear in & above the nocturnal SBL

cold-pool-driven

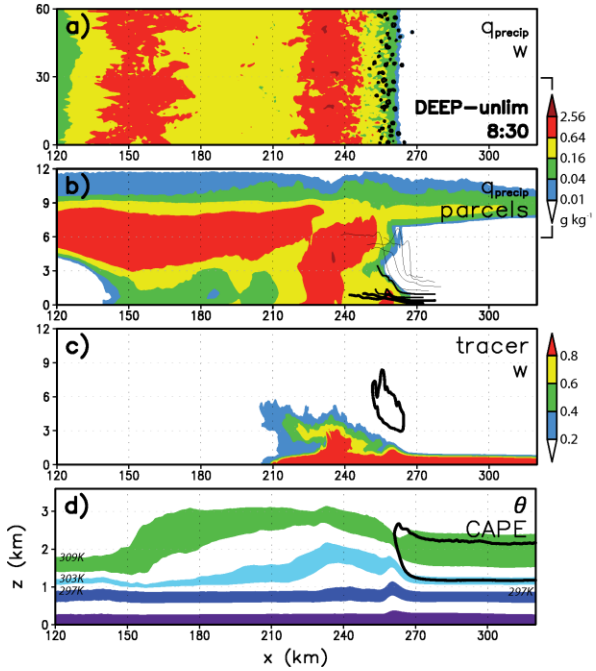



*Plan view (a) and cross-sections (b-d) of a simulated "nocturnal" MCS (adapted from Parker 2008)*

*Left panel: cold pool-driven (earlier)*

*Right panel: bore-driven (later)*

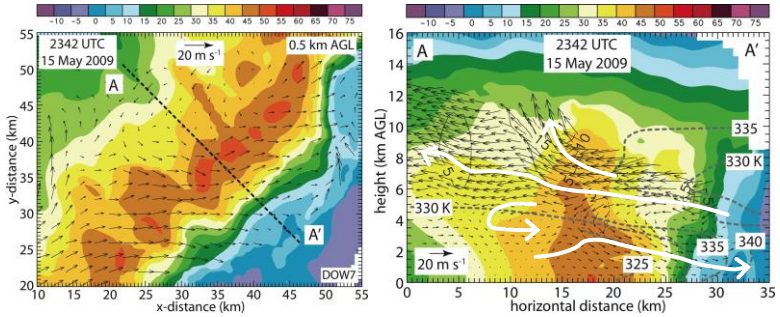
bore-driven



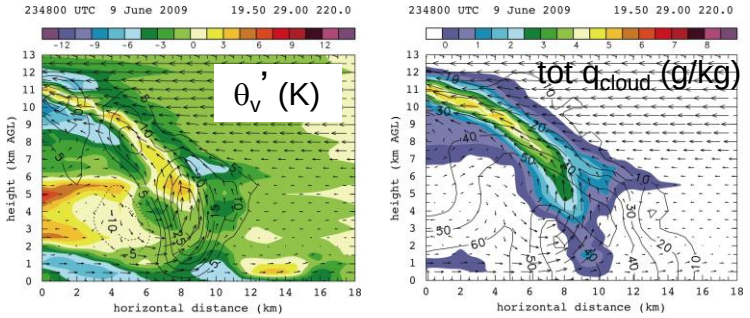
# Ziegler et al.'s proposed research methods

- *Radar & state synthesis of PECAN observations*
  - Pre-MCS environment
  - Internal MCS flow fields
  - MCS outflow intensity, structure, & trajectories

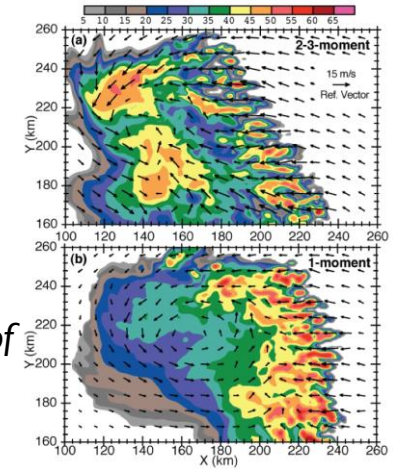
multi-Doppler ("over-determined DD")



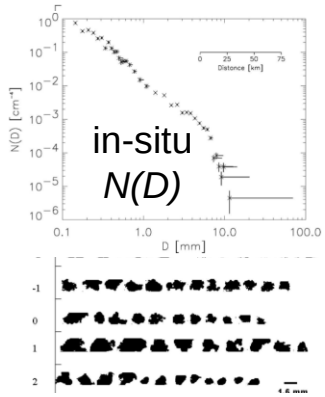

- *Diabatic Lagrangian analysis of PECAN obs*
  - Internal MCS temp/vapor & cloud/precip fields from trajectory-based kinematic cloud model




- *Process study simulations based on PECAN obs*
  - Initial conditions & validation from PECAN obs
  - Sensitivity to microphysics
  - Sensitivity to evolving pre-MCS stability and wind profiles




*Left: Plan views of a simulated MCS (Mansell 2013)*




*(McFarquhar et al. 2007)*

# Ziegler et al.'s data collection priorities

- *Most important platforms*
  - Mobile radars/P-3: high-res MD winds, 5-min (MCS) and 10-min (clear-air) volumes
  - Mobile Soundings: in convective/stratiform regions and environment
  - Surface obs: ahead, through, behind convective/stratiform regions
  - King Air, PISAs, S-POL, and DC-8 also useful when converged on MCS or CI
- *Preferred sampling methods (primarily MCS missions, also widespread CI)*
  - Start measurements at ~ sunset to capture nocturnal evolution
  - Converge mobile assets on convective region
  - Fix mobile 7-radar array (sit-and-spin), but follow MCS with other assets