

Entrainment Breakout

Monday, March 12 7:30 – 9:00 PM

7:30 – 7:45 **Krueger** – Entrainment in Cumulus Ensembles: Cumulus Parameterization versus Giga-LES

7:45 – 8:00 **Lu** – A New Approach for Estimating Entrainment Rate in Cumulus Clouds

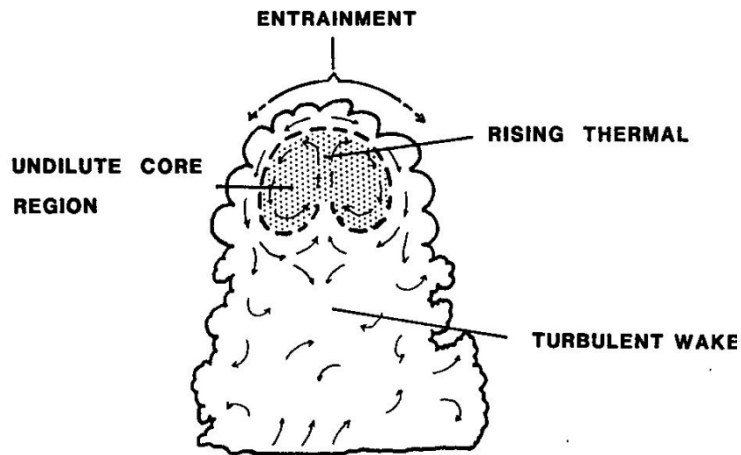
8:00 – 8:15 **Albrecht** – Estimating Entrainment Rates in Stratocumulus Clouds using MMCR Observations

8:15 – 9:00 **Jensen** – DISCUSSION: ASR Entrainment Focus Group and White Paper

The Entrainment Focus Group White Paper

http://www.gim.bnl.gov/armclouds/entrainment_workshop/Entrainment_Whitepaper_v6.pdf

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Scientific Objectives

- Determine the applicability of existing measurement techniques to ARM observations for the estimation of entrainment.
- Coordinate the development of new retrieval techniques for entrainment parameters with an emphasis on radar Doppler spectra and multi-instrument approaches
- Propose and execute coincident aircraft and surface-based remote sensing field campaigns targeting entrainment processes in shallow cumulus clouds
- Examine the connection between thermodynamic, dynamical, and microphysical properties to understand and parameterize entrainment rate and mixing mechanisms.
- Test and evaluate parcel model techniques for the parameterization of entrainment processes using existing and new datasets

Approaches

- 1) Forward modeling of new (ARRA) remote sensing observations using existing LES results
- 2) Utilize existing long-term ARM measurements to retrieve cloud and environmental parameters relevant to entrainment
- 3) Model (LES/CRM) intercomparison in order to evaluate the robustness of representation of quantities that play important roles, or are impacted by, the entrainment process including the vertical profile of humidity, buoyancy reversal, and CDNC dependencies
- 4) Inter-comparison of GCM convective parameterization schemes
- 5) Propose and carry-out a coincident aircraft and surface-based remote sensing IOP targeting entrainment processes in shallow cumulus clouds

Year One Milestones

- Collection of appropriate CRM/LES output for forward modelling activities (e.g., A. Ackerman, A. Cheng, W. Grabowski, H. Morrison, A. Khain, S. Krueger, FASTER modeling group).
- Forward modeling activities using CRM/LES output (e.g., McGill group, BNL group).
- Initial analysis of the SGP observational dataset providing estimates of geophysical quantities important for the understanding of entrainment processes. Particular focus on remote determination of cloud droplet number concentration and liquid water content. (e.g., Turner, Kollias, Jensen, T. Wagner)
- Using this analysis to define case study opportunities for LES/CRM intercomparison.