Warm season PBL evolutions from lidar observations, LASSO and single column model simulations at the SGP site

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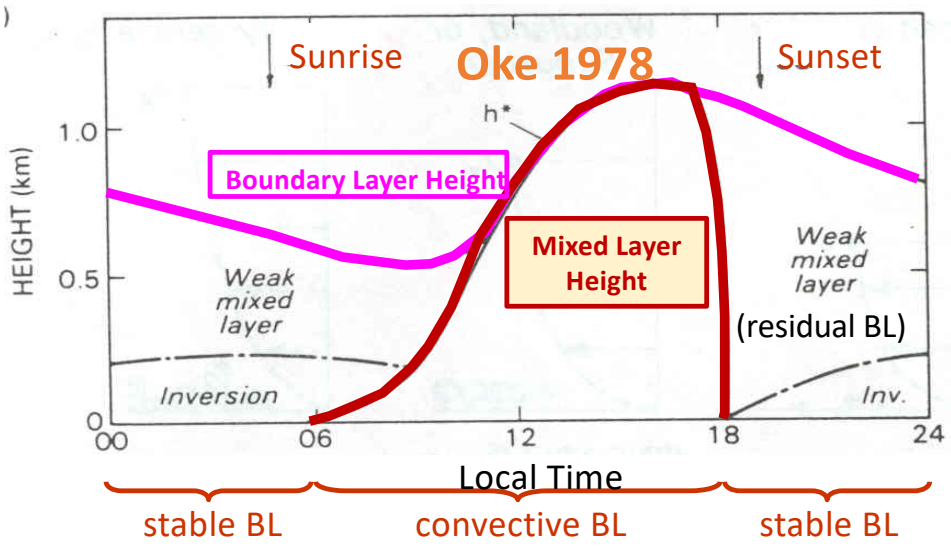

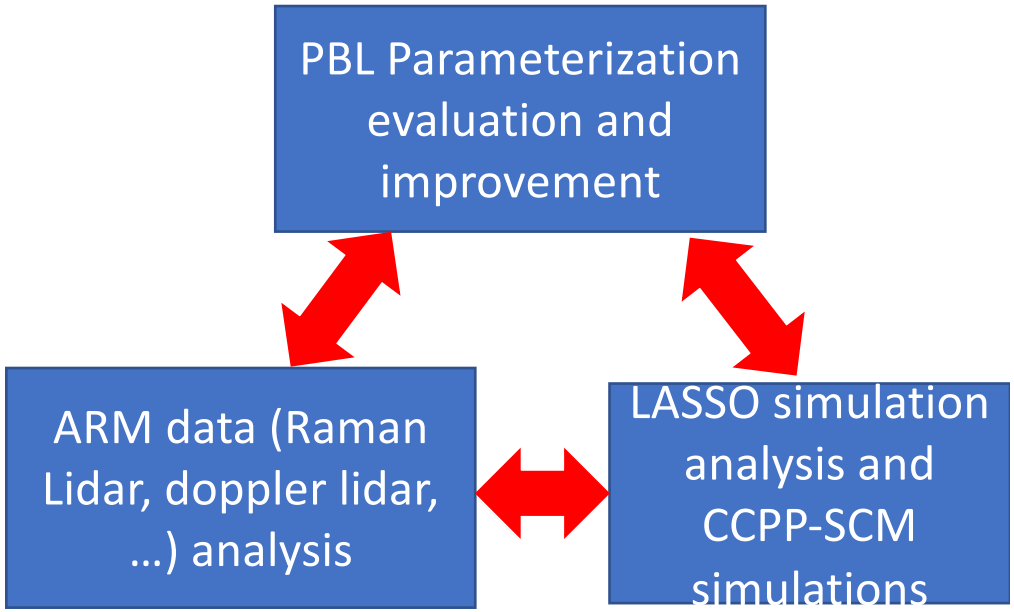

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PBL and Mixing Layer Evolution From Observations

- Develop a new method using Raman lidar water vapor mixing ratio for PBL height determinations.
- Develop a new method using Doppler lidar measurements for mixing layer height (MLH) determinations.
  - Minimize the impacts of **gravity waves**, **different-scale of eddies**, and DL system-dependent **data quality**.
- MLH variations crossing five extended sites indicating **strong spatial heterogeneity** of convective mixing layer development (land-air interactions).

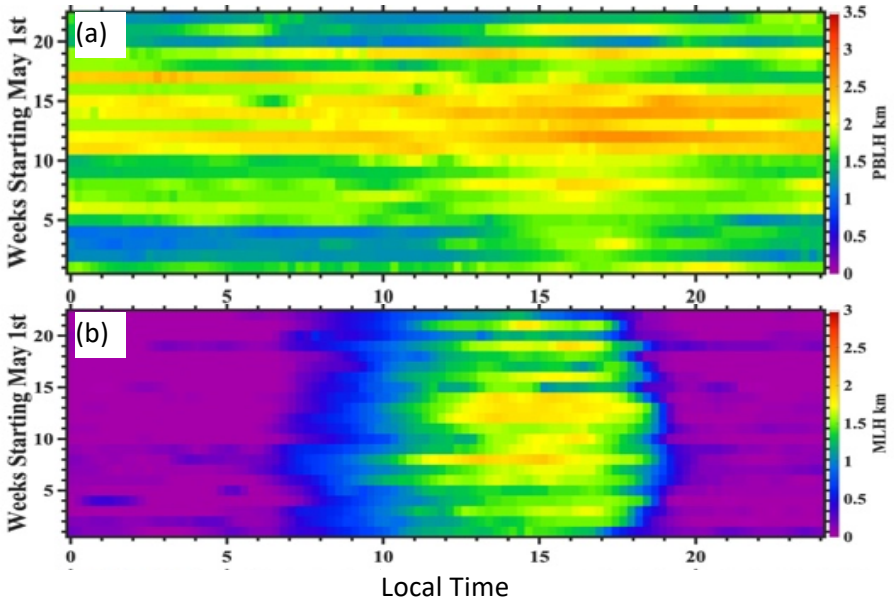

Figure: Seasonal (y-axis) and diurnal (x-axis) variations of observed PBL and MLH.

PBL Parameterization Evaluation with Single Column Model Simulations

- Use CCPP-SCM to separate **PBL physics** and **large-scale forcing** (LSF) contributions in different PBL schemes.
- **Three LSF** data for each LASSO case in 2017 were used to drive CCPP-SCM simulations with **four PBL Schemes**.
- The SCM results are intercompared with the observations on a seasonal scale.
- CCPP-SCM simulations with different PBL schemes driven by LASSO forcing offer an effective way to evaluate the performances of PBL schemes under broad **dynamical** and **thermodynamical** conditions.

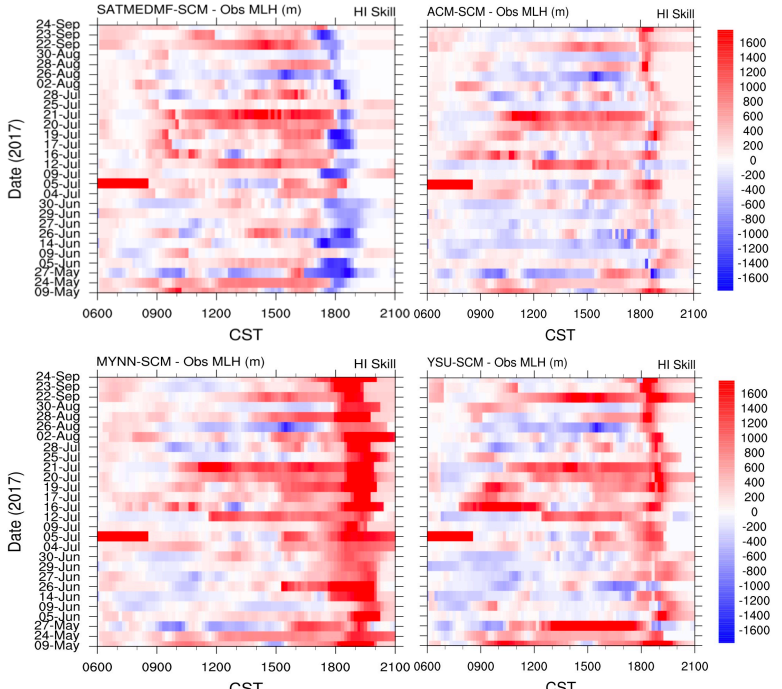

Figure : Seasonal (y-axis) and diurnal (x-axis) variations of differences in MLH (contours, m) between the SCM simulations and the lidar observations.