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# On the Use of Data Assimilation Methods to Quantify Uncertainty in Model Physics Parameterizations

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experiments represented in each row.







Posterior PDFs (as in the plots at left) of select parameter pairs. Each column corresponds to differing numbers of assimilated observations. Assimilation time period is listed at the top of each

## **Evolution of parameter PDFs in time:**

• Parameter values are fixed in time

- Assimilate increasing numbers of observations in time and
- examine the effect on posterior parameter PDFs
- Observe a shift in the character of PDFs with transition from
- Warm rain parameters control the solution at convective times Ice parameters exert greater influence late in the simulation • A multimode PDF appears rapidly during stratiform time period

## 8. CONCLUSIONS

- The influence of each parameter on the model solution can be characterized using nonlinear data assimilation methods
- The influence of additional observations can also be assessed • Increases in observation accuracy may enhance multiple modes in
- Application of suitable constraints can render a unique solution • The influence of a set of parameters on the model output is strongly dependent on the model state

## REFERENCES

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