Discussion Topics

Consideration of:

Statistics
Physics and Dynamics
Algorithms (including nonlinearity)
Interpretation
Other (including participant generated)

Statistical Considerations

1. Is a fundamental Bayesian thinking about the problem critical, just worthwhile, or a distraction? (Should investigators take some time to learn these basic concepts?)

2. In view of the non-normal pdfs associated with precipitation and moisture, what observation and control variables are most appropriate (e.g., microwave brightness T; some kind of scaled relative humidity). If the resulting transformations between these and the original observation and state variables are highly nonlinear, what are the consequences?

3. Must we consider multivariate (background) error statistics that include relationships of q to other state variables? If so, how do we do this?

Statistical Considerations

4. Can we continue to ignore horizontal correlations of observations or model errors pertaining to precipitation?

5. How can we obtain better estimates of real error statistics (observation, representativeness, model), besides just tuning parameters in our statistical models until we get better results?

Physical and Dynamical Considerations

1.   How important is it that we are able to distinguish among different types of precipitation, particularly between those convective and nonconvective in origin?

2. We currently apply balance constraints to our analysis systems, which are both necessary and appropriate in general, but are these constraints as appropriate in regions affecting and affected by precipitation? If not, what are the consequences if we do or do not modify these constraints?

Algorithm Considerations

1.   Does the present poor quality of observations and precipitation models imply that the assimilation of precipitation observations is presently not useful? If it is useful in spite of these statistics, why?

2. Can we pose a cost function that is more qualitative and thus more reflective of the present uncertainty of input information?

3. It is claimed that the consideration of model error in a weak-constraint 4DVAR will generally act to smooth an otherwise nonlinear cost function, thereby mitigating the presence of multimodality. Is this true, necessary, and sufficient, or is the problem simply morphed in appearance?

Interpretation

1.   Since unlike large-scale weather patterns, precipitation is both intermittent, inhomogeneous, with small horizontal scale, what measures of forecast or success scoring are most informative?

2. How should we interpret the significance of results from case studies presented with no accompanying statistical results? What additional kinds of information would be most useful in such reporting?

3. How should we interpret subsequent forecasts that show "success" for a few hours but that quickly thereafter is lost?

4. Can we define some clear and focused research questions that can be unequivocally answered and used as a foundation for operational developments, but that do not require use of a complete operational data assimilation system?

Other Questions