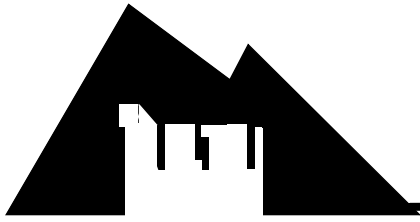


The RAL Seminar Series



NCAR

Object-based Evaluation of Weather Forecasts: Overview and Approach

by

Barbara Brown
NCAR/RAL

Tuesday, 23 August 2005
Foothills Lab Building 2 Auditorium, Room 1022
3:30 p.m.

In addition to basic monitoring of forecast performance over time, the fundamental goals of forecast verification are to provide information about forecast quality that (a) can be used by forecast developers to improve forecasts/models and (b) can be used by end users to aid in their interpretation and use of the forecasts. These goals are often difficult, or impossible, to meet with traditional scalar verification measures, as has been pointed out numerous times in the verification literature. Recently, these measures have been found to be particularly deficient for measuring the quality of higher resolution NWP forecasts and for providing operationally meaningful information to users of these forecasts. Thus, in the last few years, a number of research efforts have focused on development of alternative verification approaches, with the primary emphasis on spatial forecasts of precipitation and convection. These approaches are reaching maturity and are demonstrably able to help overcome some of the limitations associated with traditional grid-based verification approaches. Examples of the new approaches include scaling analyses, composite approaches, and object- or entity-based approaches.

This presentation will include a review of several of the new diagnostic verification approaches, and will describe in greater detail a new object-based approach. The object-based approach has been applied to precipitation forecasts from the Weather Research and Forecasting (WRF) numerical weather prediction model, for evaluation of both mesoscale and convective rain areas. Currently it is also being applied to nowcasts of convection produced by the NCAR Autowcaster system. The convolution-thresholding technique used to identify regions of interest ("objects") in the forecast and observed fields will be described and demonstrated, and methods and issues associated with the process of matching pairs of forecast and observed objects will be considered. Basic examples of applications of the approach to the WRF precipitation fields and to the Autowcaster nowcasts will be presented. These examples will demonstrate the capabilities of the object-based approach (and other diagnostic approaches) to provide much richer information about the performance of the forecasts than can be obtained from standard scalar verification measures. Specific applications of the object-based approach to WRF precipitation forecasts will be presented by Chris Davis in a related seminar on August 25.