ECMWF Seminar on Diagnosis of Forecasting and Data Assimilation Systems, 7-10 September 2009

Travel report
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The annual ECMWF seminar covered various aspects of diagnosing the performance of forecasting and data assimilation systems. There were five one-hour lectures every day, and additional time for questions and discussion was also provided. There were around 60 participants at the seminar. Most of the participants were from the ECMWF member states but also more distant countries, such as Hong Kong, were represented. The practical arrangements of the seminar were excellent. In the following I shortly summarize some interesting topics of the seminar. All the presentations can be found from:
http://www.ecmwf.int/newsevents/meetings/annual_seminar/2009/presentations.html

The seminar begun with an introductory lecture to diagnostics, given by Tim Palmer. He emphasized the importance of model diagnosis with various examples "what looks good might actually be bad" the reason being that different forcings can exhibit similar responses while the errors compensate each other. Mad Rodwell introduced the diagnosing tools used at ECMWF. The aim is seamless diagnosis of the entire forecasting and data assimilation system. In data assimilation, diagnostics are produced in the observation space e.g. in terms of data count, first-guess departures, and in model space in terms of analysis increments for prognostic and other parameters. For the weather forecasts the diagnostics are produced in terms of forecast error (mean, standard deviation, rms) with special emphasis on scale dependent error and activity.

Peter Bauer discussed diagnosing the impact of satellite observations within data assimilation. Satellites provide an enormous amount of observations for the forecasting models and the observations have an excellent spatial coverage. In the ECMWF model, in screening 99% of all observations originate from satellites, and 95% in the actual assimilation. Radiance data dominates the data assimilation with 90% of the observations. The quality of the satellite data is monitored carefully using time evolution of different statistics. Observing system experiments are continuously performed for assessment of observation impact e.g. along model updates, and study of basic impact features. Data denial experiments (control, no radiosonde data, no satellite data) have shown that satellite data is the most important source of observations both in Northern and in Southern hemisphere.

Thomas Jung presented a relaxation technique to diagnose remote origins of forecast error. The method in short is as follows. First, a region is chosen. Second, during the forecast the development of forecast error in this region is artificially suppressed. This can be done for example by relaxing the forecast towards the analysis. Third, the impact of the forecast error suppression is studied elsewhere. The technique has been used successfully in studying medium-range and monthly predictability, and seasonal mean circulation anomalies.

I acknowledge EMS for the Young Scientist Travel Award which enabled my participation to this very interesting seminar.