



Meteorology Seminar

Title: The Weather Research and Forecasting model (WRF) based 4-Dimensional Variational (4DVAR) data assimilation system.

Speaker: Dr Xiang-Yu Huang, NCAR, Boulder, Colorado

Date: Thu 5th October 2006 at 2:15PM

Location: Mathematical Sciences Seminar Room

Abstract: The 4DVAR idea has been pursued actively by research community and operational centers over the past two decades. The 4DVAR systems have a number of advantages including the abilities to: 1) Use observations at the almost exact times (to the width of the observation windows, see the discussion in the next section) that they are observed, which suits most synoptic data, 2) Implicitly use flow-dependent background errors, which ensures the analysis quality for fast developing weather systems, and 3) Use a forecast model as a constraint, which ensures the dynamic balance of the final analysis.

The last mentioned advantage also implies that the current WRF 3DVAR should be enhanced with a 4-dimensional capability, using the WRF forecast model as a constraint, in order to provide the best initial conditions for the WRF model. The WRF 4DVAR has been under extensive development since 2004. It uses the WRF model and WRF 3DVAR as its basic components. The prototype of WRF 4DVAR was built in 2005 and has under continuous refinement since then. Many single observation experiments have been carried out to validate the correctness of the 4DVAR formulation. A series of real data experiments have been conducted to assess the meteorological

performance of the 4DVAR system. Preliminary results indicate that the 4D-Var works properly and can be used to assimilate many observations of different types.

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