

The Emergence of Numerical Weather Prediction: Fulfilment of a Dream & Realization of a Fantasy.

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Abstract

The development of computer models for numerical simulation and prediction of the atmosphere and oceans is one of the great scientific triumphs of the past fifty years. Today, numerical weather prediction (NWP) plays a central and essential role in operational weather forecasting. Forecasts now have accuracy at ranges beyond a week.

There are several reasons for this: enhancements in model resolution, better numerical schemes, more realistic parameterizations of physical processes, new observational data from satellites and more sophisticated methods of determining the initial conditions. We focus in this talk on the fundamental equations, the formulation of the numerical algorithms and the variational approach to data assimilation. We present the mathematical principles of NWP and illustrate the process by considering some specific models and their application to practical forecasting.

As a bonus, we examine an artist's impression of Lewis Fry Richardson's marvellous 'fantasy' of a Forecast Factory, recently uncovered in the School of Computer Science and Statistics at Trinity College Dublin.