

**Reconsidering the Aims of Weather Prediction, Again**

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**Abstract**

Whoever first attempted to predict the weather no doubt tried to state (or control) what would happen in the future. By the time of Fitzroy, however, the realities of real-time weather forecasting had broadened those aims to “an idea of the weather thought probable,” this in the face of attack both from the scientific establishment (the Royal Society) and from pre-existing economic competitors (almanac writers). With the arrival of the electronic computer, von Neumann swung the pendulum back toward the goal of stating (or controlling) what would happen, even as Charney expressed reservations. The goal of stating the future was supplemented by Tennekes’ “no forecast is complete without a forecast of the forecast skill” which in part led to Ensemble Forecasting Systems. Anna Trevisan’s paper in the 90’s appeared as Tennekes’ call for expectation management morphed into a new aim: the provision of probability distributions. Today the field of battle has, to some extent, moved on from ensemble formation schemes to the development and evaluation of probability forecasts. Probability forecasts are, of course, also incomplete without a forecast of their relevance: the probability of a big surprise.

Today, might we reconsider whether or not we can achieve the aim of providing useful probabilities (probability which can be used as such) even in principle? Arguably, precise probabilities are not obtainable (due to model inadequacy) just as precise point forecasts were not obtainable (due to nonlinearity and chaos). I suggest we return to aims closer to those of Fitzroy: the early detection of significant events of interest to us. We can extend the application of modern data assimilation from assimilating an uncertain past to also assimilate uncertain information regarding the future; literally hunting for a glimpse of significant events in the extended range and then monitoring their plausibility as time passes. We will not know their probabilities, but then we do not have such things now! And we can see them coming much earlier if we aim for them.