WHAT ARE THE ODDS ON A GOOD PROBABILITY FORECAST?

L.A. Smith(1,2), K. Judd (3), L. Clarke (2), and D. Kilminster (1)

(1) Pembroke College, Oxford UK, (2) CATS, London School of Economics London UK, (3) Dept of Mathematics, UWA Perth Australia

Within the operational weather forecasting community, it is now widely accepted that uncertainty in the current analysis makes the aim of a single ``accurate'' medium-range forecast unobtainable; this is a central motivation for operational ensemble forecasts. Information from ensemble forecasts is crucial for extracting the socio-economic value that has justified operational forecasts over the last century and a half; it also plays a new role in defining the empirical connection to the atmosphere that
turns model simulations into weather forecasts. It is less widely accepted, but equally certain, that model inadequacy (shortcomings in the detail of any model class whether stochastic or deterministic) will prevent
accurate, accountable probability forecasts. The implications this fact holds both for users and for modellers is explored. The most common foundations objective probability theory are based upon the notion of equally likely events; this option is lost outside the perfect model scenario.
The evaluation and use of probability forecasts suggests the development of a truly multi-model framework (as opposed to an unknown ``best model'' framework)
and an alternative approach to defining ``fair odds'' where the ``implied probabilities'' corresponding at a set of odds need not sum to one.