

Trends and fluctuations in skill at forecasting temperature and precipitation, focusing on predictions of extreme events associated with major bushfires and flooding

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Verification measures such as the S_1 skill score, anomaly correlation and root mean square (RMS) error, demonstrate that there has been an increasing skill in numerical weather prediction model (NWP) forecasts of the broad scale circulation. One might expect that increasing the skill of NWP models at forecasting the circulation would translate into corresponding improved forecasting of associated weather, but documentation of evidence identifying such improvements is limited. This paper reports on analyses of data associated with official, and experimental weather forecasts generated in real-time out to Day-14 for Melbourne, in order to document some of that evidence.

Firstly, an analysis of a 50-year data set of maximum temperature forecasts is made, placing a focus on trends and fluctuations in skill, and illustrative examples associated with the prediction of extreme events associated with bush fires, such as 7-Feb-2009. Official Day-1 forecasts of maximum temperature explained 64.1% of the variance during the first year associated verification data is available (to 30-Jun-1961), but this has increased in the most recent 12-month period ended 17-Apr-2013, to 88.6%. Official Day-4 forecasts explained 20.1% during the first year they were issued (to 25-Feb-1987) – now they explain 72.6%. Experimental Day-10 forecasts currently explain 16.7% of the variance.

Secondly, an analysis of a 15-year data set of quantitative precipitation forecasts is made, the focus once again being placed on trends and fluctuations in skill, and illustrative examples associated with the prediction of extreme events associated with flooding, such as 4-Feb-2011. Official Day-1 forecasts of precipitation amount explained 29.1% of the variance during the first year associated verification data is available (to 8-Sep-2000), but this has increased to 56.9% in the most recent 12-month period to 17-Apr-2013. Experimental Day-10 forecasts explained only 1.1% variance during their first year (to 20-Aug-2007), but this has since increased to 6.6%.

