Aust. Met. Mag. 31 (1983) 65-66

Correspondence

ARPE prognosis and subjective forecasts

I refer to the article in the June 1982 *Australian Meteorological Magazine* by F. Woodcock and N. Nicholls.

I would like to draw attention to the comparison of the ARPE prognosis performance of maximum temperature forecasts with the subjective forecasts produced for the same period at the NSW Regional Office.

Referring to Table 3 of the article, mean absolute errors for the machine product and manual forecasts were 4.9 and 1.8°C respectively. This gives an incorrect impression of the value of the ARPE product. Manually produced forecasts are strongly influenced by the ARPE. Certainly in the Victorian Office it is considered the most important forecasting guidance at present. There is evidence that since the product's introduction, skill levels at the VRO have increased (Stern 1980).

As indicated in Table 5 the regressive forecasts can be considerably improved (mean absolute error 2.3°C) by eliminating some of the more poorly forecast parameters from the regression equations. This in fact represents the manner in which the forecaster used the ARPE, being influenced mostly by those elements he considers of better quality.

I also query the suggestion in the article that effort be directed at improving the low level prognosis data. This is not necessarily the most productive course. It really depends on the predictability or the amount of improvement that is tractable in comparison with the other parameters. More improvement might be gained by abandoning these lower levels from the regression sceheme as in Table 5 and trying to improve the other prognosis parameters.

Finally I draw attention to the absence of Table 6.

C. M. Taylor

References

Stern, H. 1980. An increase in the skill of Australian temperature forecasts. *Aust. Met. Mag. 28*, 223-8.

Woodcock, F. and Nicholls, N. 1982. A methodology for numerical prognosis evaluation using objective local weather retrieval. *Aust. Met. Mag. 30*, 155-61.

Reply

Taylor has raised a number of points about the interpretation of the results reported by Nicholls and Woodcock. His comments indicate that some confusion exists about the conclusions reached in the original paper and I appreciate the opportunity to clarify these conclusions.

Woodcock and Nicholls (1982) proposed the use of a perfect prognosis approach to evaluate numerical prognoses in terms of local weather forecasts. The suggested methodology was applied, as an example, to the impact of the operational Australian region primitive equation model low level prognoses on Sydney, January daily maximum temperature forecasts. The limitation of some of Woodcock and Nicholls' conclusions to this specific example requires emphasis.

It was concluded that the prognosis fields required improvement, especially in the low level temperature fields, before they could provide operationally-useful forecasts of Sydney, January maximum temperatures. It was *not* concluded that the prognoses could not provide forecast guidance, especially for other locations or months. Also, as was noted by Taylor, Table 5 in Woodcock and Nicholls indicates that improved guidance can be obtained by only using parameters that are well predicted by the model. This is the essence of the Model Output Statistics (MOS) approach to the use of prognoses as forecast guidance. Woodcock and Southern (1983), using the MOS approach, have demonstrated the value of the prognoses as forecast guidance for a number of locations.

However, even the MOS forecasts do not greatly improve on the subjective forecasts. The point of the example in Woodcock and Nicholls was that improvement in the low level prognoses could lead to *major* improvements in forecast accuracy. Table 6 (referred to in, but accidently omitted from, Woodcock and Nicholls, and included below) supports this contention. Improving the performance of the model at upper levels is unlikely to lead to such marked improvement since the relationship between surface temperature and atmospheric behaviour at these levels is less pronounced. Maximum temperature is most closely related to low level atmospheric behaviour so model improvements at these levels are likely to lead to the greatest improvement in forecast accuracy.

It should also be noted that the numerical model whose prognoses were used in Woodcock and Nicholls was, because of computing limitations, far from ideal, especially in its treatment of the lower levels. As operational computing limitations relax, improved versions of the model will be introduced, leading to improved forecast guidance.

N. Nicholls

References

Woodcock, F. and Nicholls, N. 1982. A methodology for numerical prognosis evaluation using objective local weather retrieval. *Aust. Met. Mag. 30*, 155-61.

Woodcock, F. and Southern, B. N. 1983. The use of linear regression to improve official temperature forecasts. *Aust. Met. Mag. 31*, 57-62.

Table 6. Maximum likely impact of perfect prognoses on 62 Sydney, January daily maximum temperature forecasts.

Forecast Method	Levels Used	Skill (%)	
		Alone	Consensus with Bureau forecasts
Objective	MSL, 1000 mb, 850 mb	74	87
	MSL, 850 mb	51	79
	MSL	59	71
	850 mb	38	70
Subjective		57	