

Numerical prediction model performance summary July to September 2002

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Introduction

This summary continues the series reporting on the performances of Numerical Weather Prediction (NWP) models used operationally in the Bureau of Meteorology.

Models are from the National Meteorological and Oceanographic Operations Centre (NMOC) Melbourne and from ECMWF (European Centre for Medium-range Weather Forecasts), NCEP (National Centers for Environmental Prediction, USA), UKMO (Met Office, United Kingdom) and JMA (Japan Meteorological Agency).

Four models considered from NMOC are: LAPS_PT375 (Limited Area Prediction System Point 375); MESO_LAPS_PT125 (MESOscale Limited Area Prediction System Point 125) TLAPS_PT375 (Tropical Limited Area Prediction System Point 375); and GASP (Global Assimilation and Prediction).

Overseas global models included in the comparisons are: ECSP (ECMWF Spectral Assimilation); USAVM (NCEP Spectral model for aviation); UKGC (UK Meteorological Office Grid Point model); and JMAGSM (JMA Global Spectral Model).

Brief summaries of the models can be found in the initial article (Skinner 1995) with references to model updates in subsequent issues. The NMOC limited area models are run several hours earlier than GASP and this premature data cut-off, particularly for satellite information, could adversely affect their skill relative to GASP. The US, UK and JMA models run with a

short data cut-off time of about three hours, compared with 7 hours for GASP and 10 hours for ECMWF.

All results have been calculated within NMOC Melbourne, where the models were verified against their own analyses. A description of the Australian verification methods can be found in a previous article (Skinner 1995). From the array of measures computed the statistics presented here are for 500 hPa geopotential height and mean sea level pressure (MSLP) over the irregular Australian verification area (Fig 4). Note that this Australian region verification grid has southerly points that are outside the TLAPS_PT375 domain and easterly points outside the MESO_LAPS_PT125 domain. TLAPS_PT375 and MESO_LAPS_PT125 scores are calculated without these points and are hence not strictly comparable with those from other models.

Notes on NWP systems

Local models

No major change has been reported since September 2002 when NMOC commenced the operational run of a new version of the LAPS_PT375 system.

Overseas models

In the NWP Gazette of December 2002, the UK Met Office reported the introduction of a new initialisation scheme for data assimilation into the global suite. Details of the changes can be found online at: http://www.metoffice.com/research/nwp/publications/nwp_gazette/dec02/model.html

No major change has been reported from ECMWF

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Fig. 1(a) Comparison for LAPS_PT375/ TLAPS_PT375/GASP from July to September 2002. S1 skill-scores of MSLP using combined base-times 0000 UTC / 1200 UTC and intervals +12,+24,+36,+48 h over the irregular Australian verification grid.

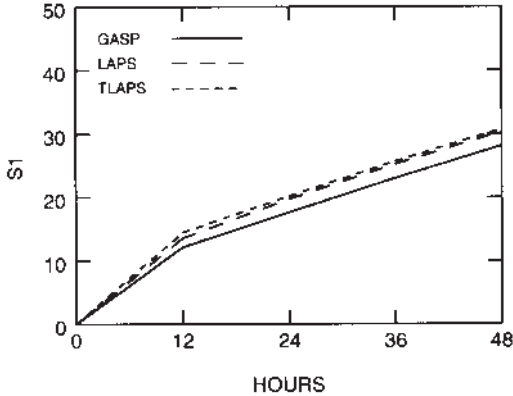


Fig. 1(b) Comparison for LAPS_PT375/ TLAPS_PT375/ GASP from July to September 2002. S1 skill-scores of 500hPa geopotential height for combined base-times 0000 UTC /1200 UTC and intervals 12,+24,+36,+48 h over the irregular Australian verification grid.

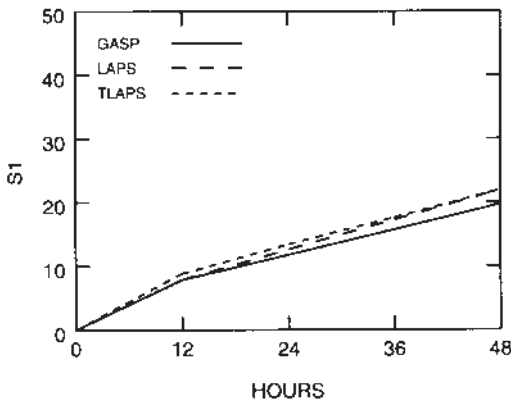


Fig. 2(a) Comparison for GASP/ECSP/USAVM/UKGC /JMAGSM from July to September 2002. S1 skill-scores of MSLP for combined base-times 0000 UTC / 1200 UTC and intervals +24 h to +192 h over the irregular Australian verification grid.

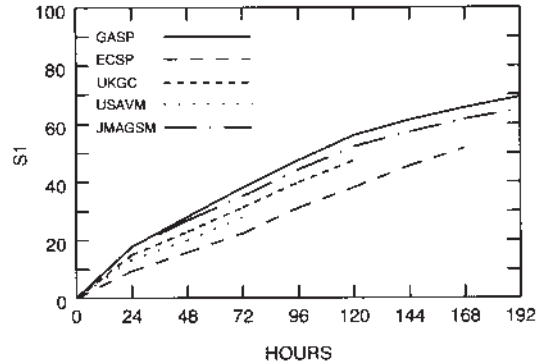
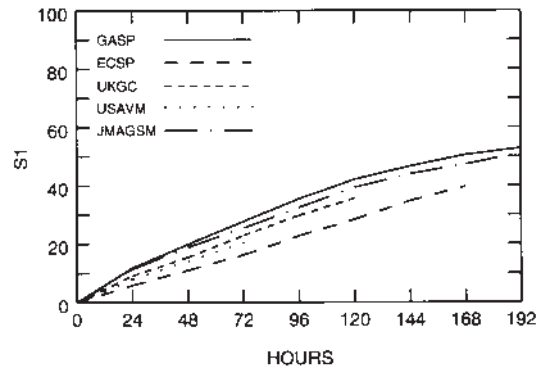


Fig. 2(b) Comparison for GASP/ECSP/USAVM/ UKGC/JMAGSM from July to September 2002. S1 skill-scores of 500hPa geopotential height for combined base-times 0000 UTC/1200 UTC and intervals +24 h to +192 h over the irregular Australian verification grid.



and NCEP.

Review of performance July to September 2002

Local models: (GASP, TLAPS_PT375, LAPS_PT375)

The verification using S1 skill score (Fig. 1) shows that GASP retains its slight lead in forecasts of both MSLP and 500hpa geopotential height throughout the

first 48-hour forecasting period.

Global models: (GASP, ECSP, UKGC, USAVM, JMAGSM)

The verification scores for the predictions from the global models (Fig 2) continue to show the ECMWF predictions as the most skilful. The US was the next best on average, followed by the UK model. The JMA is showing steady progress and out-performed GASP