

# ROYAL METEOROLOGICAL SOCIETY: AUSTRALIAN BRANCH MEETING

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## Assimilation, Numerical Prognosis and Data Impact in the Southern Hemisphere Utilising FGGE Data

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Dr Bourke (ANMRC) described experiments conducted with his colleagues Mr R. Seaman and Dr K. Puri to test the impact of FGGE observing systems on analysis and prognosis in the southern hemisphere.

The vehicle chosen to perform the tests is the 4-dimensional assimilation scheme that incorporates at 6-hourly intervals deviations of surface pressure, temperature, moisture and wind into a wave-number 21, 9-level version of the ANMRC spectral model, together with a non-linear normal mode initialisation scheme that is used following data insertion.

A period of 10 days during the second FGGE Special Observing Period (SOP-2) was chosen for the tests.

The results of the experiments were divided into two parts. First the good quality of the analyses produced by the assimilation scheme was demonstrated by subjectively comparing an assimilation analysis with the equivalent analyses produced by the NMAC, Melbourne, the NMC Washington, and the South African Meteorological Service. All four analyses showed remarkably good agreement, both at the surface and at upper levels. One wonders if such good agreement could ever have occurred without the drifting buoys and the TIROS-N satellite. Three prognoses were computed from the assimilation series, based two days apart, and compared with prognoses computed from operational analyses, but using the same prognosis model. Superior performance in the Australian region in particular was demonstrated in each case, showing that the assimilation system is producing good quality analyses\*. It was also demonstrated, admittedly only in one case, that the often occurring operational problem of equatorward drift of the sub-tropical ridge was sensitive to analysis and in particular was absent initialising from the assimilation analyses although present when utilising the operational analyses.

The second phase of the results was to demonstrate impact of the drifting buoy and the TIROS-N data. This was done by twice repeating the nine days of assimilation, once withholding the drifting buoy data, and once withholding the satellite temperature data. Repeating the same three

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\* The data base available to the operational analysis was, however, not necessarily as comprehensive as that available to the non-real-time assimilation analysis.

prognoses in each showed positive impact of drifting buoy data and of the TIROS-N data, at both 24 and 48 hours, in S1 skill scores over the Australian region. The impact of the buoy data is greater in the lower levels, and the impact of the TIROS-N data is greater in the upper levels.

This short period of assimilation served to show the audience how vital both the drifting buoy and the satellite temperature retrievals are to Australian meteorology if southern hemisphere prognosis accuracy is to reach the levels routinely achieved in the northern hemisphere.

F.Q.N.