

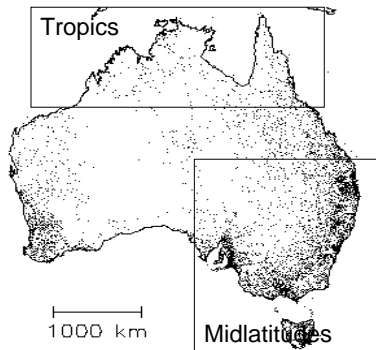
# Quantitative Precipitation Forecasts over Australia from Operational NWP Models

## Results for 2007-08

WGNE annual meeting, 2008

Centre for Australian Weather and Climate Research

### Verifying data



0.25° resolution objective analysis, averaged onto:

- 1° grid
- 0.5° grid

### Selected verification scores

*Bias and equitable threat scores*

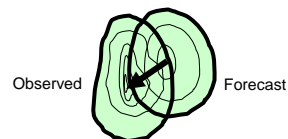
$$BIAS = \frac{hits + false\ alarms}{hits + misses}$$

$$ETS = \frac{hits - hits_{random}}{hits + misses + false\ alarms - hits_{random}}$$

Thresholds of 1 mm/day (~ all rain) and 20 mm/day (heavy rain)

*Location error*

Determined using pattern matching of contiguous rain areas (CRAs)



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Seasonal summary of daily verification results - Internet Explorer provided by Dell

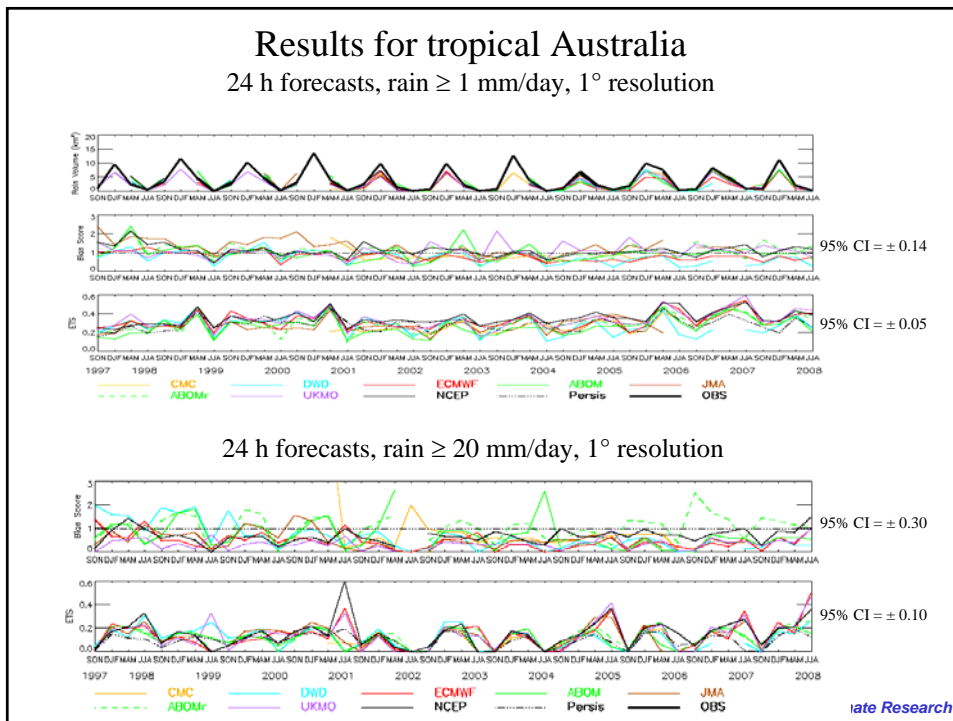
http://www.bom.gov.au/bmrc/wefor/staff/eee/wgne/0.5deg/wgnesum.html

### Seasonal summary for daily precipitation forecasts verified at 0.5° latitude/longitude resolution

Season	24 h forecasts		48 h forecasts		72 h forecasts	
	Tropics	Midlatitudes	Tropics	Midlatitudes	Tropics	Midlatitudes
JJA2008	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>
	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>
	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>
	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>
	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>
	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>
MAM2008	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>
	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>
	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>
	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>
	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>	<a href="#">Statistics</a>
	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>	<a href="#">BinaryScores</a>
DJF2008	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>	<a href="#">BinnedErrors</a>
	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>	<a href="#">Displacements</a>
	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>	<a href="#">DifferenceMap</a>
	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>	<a href="#">TimeSeries</a>
	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>	<a href="#">ScatterPlot</a>
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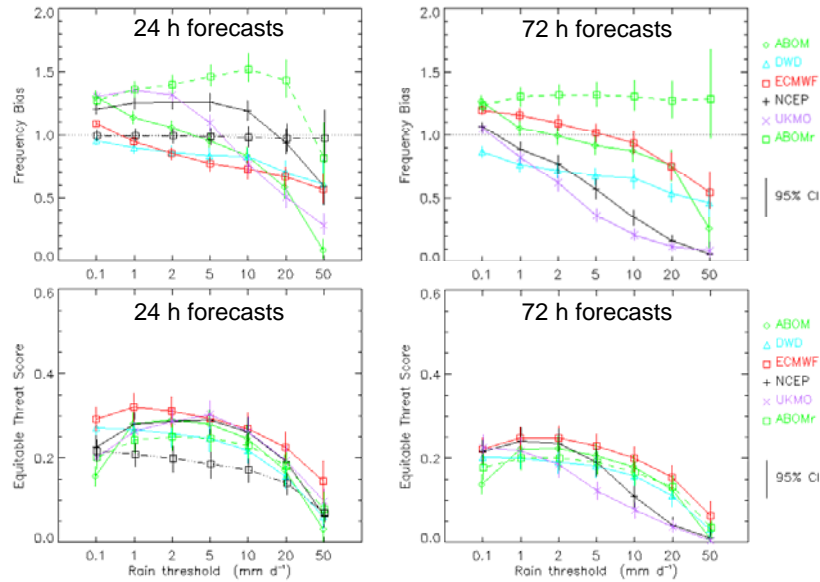
3 spatial resolutions:  
1.0°, 0.5°, stations

<http://www.bom.gov.au/bmrc/wefor/staff/eee/wgne/QPFverif.html>



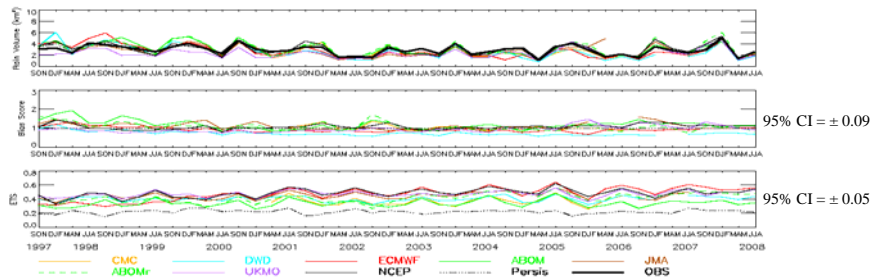
# Results for tropical Australia

Summer 2007-2008, 0.5° resolution

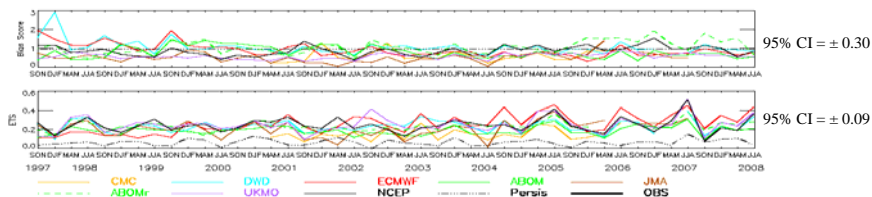


# Results for mid-latitude Australia

24 h forecasts, rain  $\geq 1$  mm/day, 1° resolution



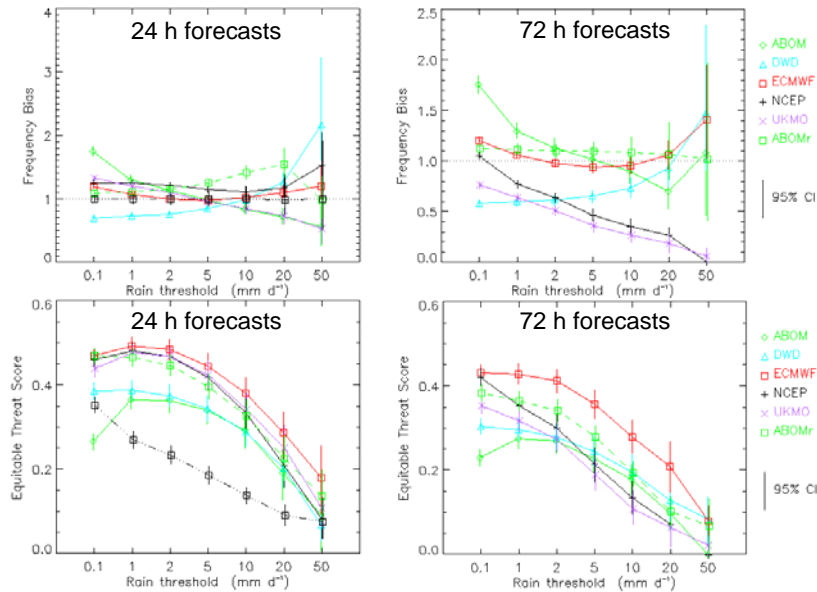
24 h forecasts, rain  $\geq 20$  mm/day, 1° resolution



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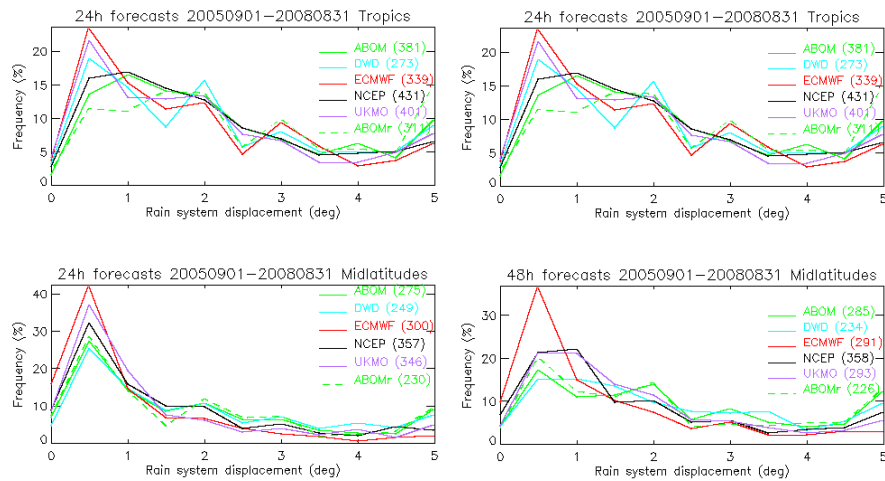
# Results for mid-latitude Australia

September 2007 – August 2008, 0.5° resolution



# Verification of rain system location

September 2005 - August 2007 (2 years), 0.5° resolution

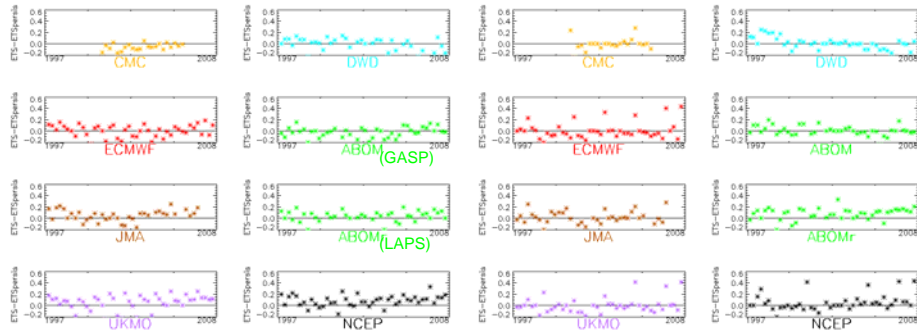


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# Are model QPFs improving with time?

$$ETS_{model} - ETS_{persistence}$$

Seasonal values for tropical Australia  
24 h forecasts, Sept 1997 - Aug 2008, 1° resolution



Rain  $\geq$  1 mm/day

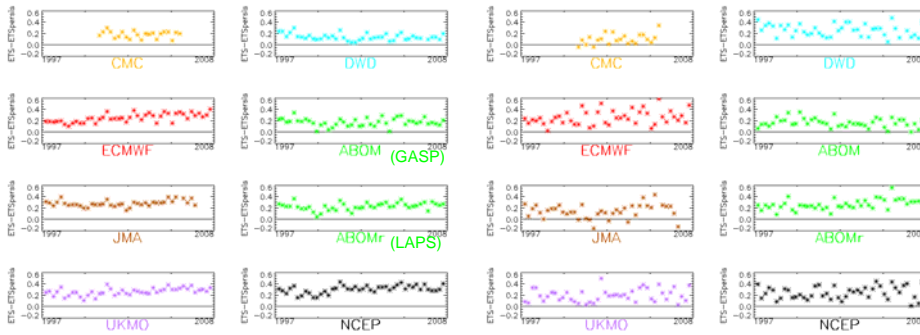
Rain  $\geq$  20 mm/day

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# Are model QPFs improving with time?

$$ETS_{model} - ETS_{persistence}$$

Seasonal values for mid-latitude Australia  
24 h forecasts, Sept 1997 - Aug 2008, 1° resolution



Rain  $\geq$  1 mm/day

Rain  $\geq$  20 mm/day

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