

Reading the weather signs

By David Dowling

Thirty years ago, the weather forecast was viewed as little more than an educated guess — a standing joke or a conversation starter. If the forecast was for a sunny day, you were well advised to take your umbrella.

But when was the last time the Bureau of Meteorology (BOM) got the daily forecast totally wrong? If the forecast is for showers, then that's what you are going to get.

And they can just about tell you how much rain you will get and what hour of the day it will fall. It's not always totally correct, but pretty accurate considering the complexity of predicting the behaviour of trillions of litres of circulating gases in the 120 kilometres or so of atmosphere blanketing the earth. Not to mention the need to include the just-as-complex circulation patterns in our oceans as well as the driving forces for these patterns — things like sunspots, geothermal activity and man-made influences.

On a day-to-day basis, our short term forecasts are fairly accurate. But the further into the future you go the harder it gets. In fact, some of the important longer term processes may rely on random events and be impossible to predict.

FIGURE 1: The Australian Cottongrower web site www.cottongrower.com.au



From a farming point of view, the daily forecast is important of course, but not much of an improvement over looking out the window each morning.

MEDIUM TERM IMPORTANCE

But if you have a good idea of what the weather has in store next week or the

week after, it can make a big difference to management decisions such as planting, harvesting, spraying, irrigation, defoliation and even marketing decisions. These medium term forecasts are of more value than either short or long term forecasts.

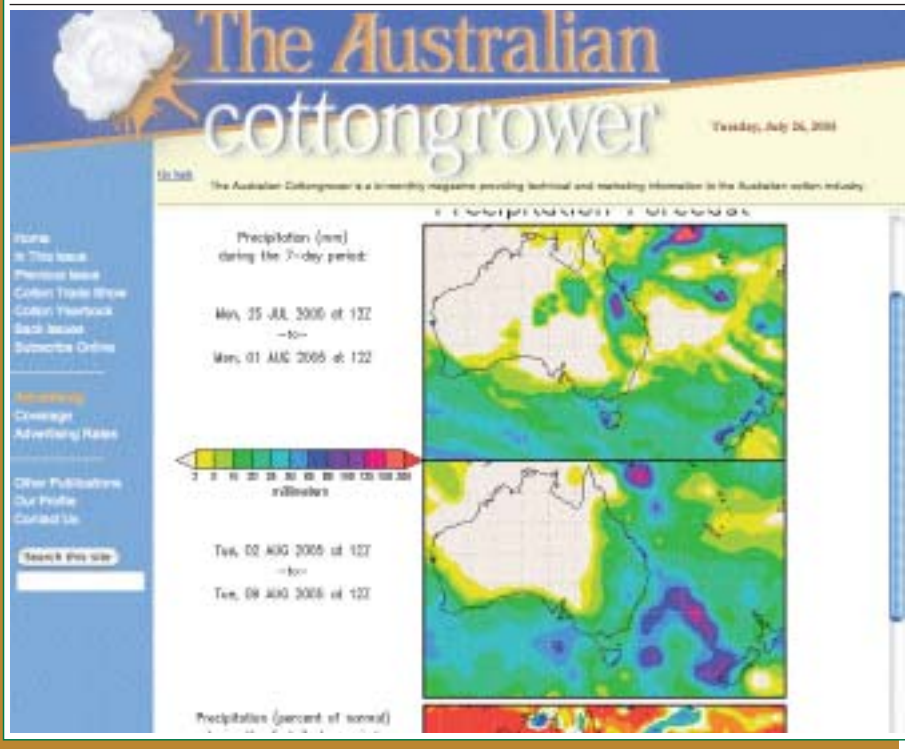
The good news is that the accuracy of medium term forecasts has become much better in recent years. There are still some major weather 'events' which seem to come out of nowhere, but most of them give a reasonable fore-warning.

While the BOM freely issue short term forecasts and seasonal outlooks, they are not as forthcoming with medium term forecasts. You can get excellent forecasts out to four days in their weather-by-fax service (<http://www.bom.gov.au/other/wbf/nat.shtm#Nat>) and through SILO which provides a whole range of weather information related to agriculture. But SILO comes at a considerable cost and most of its components are available either freely or at much lower cost at other internet sites.

While BOM insists on charging big fees on some products, equivalent organisations in the US and Europe provide their information at no charge.

As do most farmers, I have a keen interest in weather and climate forecasting and have incorporated my favourite information sources as links from *The Australian Cottongrower* web site (www.cottongrower.com.au — see Figure 1). Fol-

FIGURE 2: The COLA 14 day rainfall forecast



lowing is a short rundown of the most informative weather links.

GLOBAL MODELS

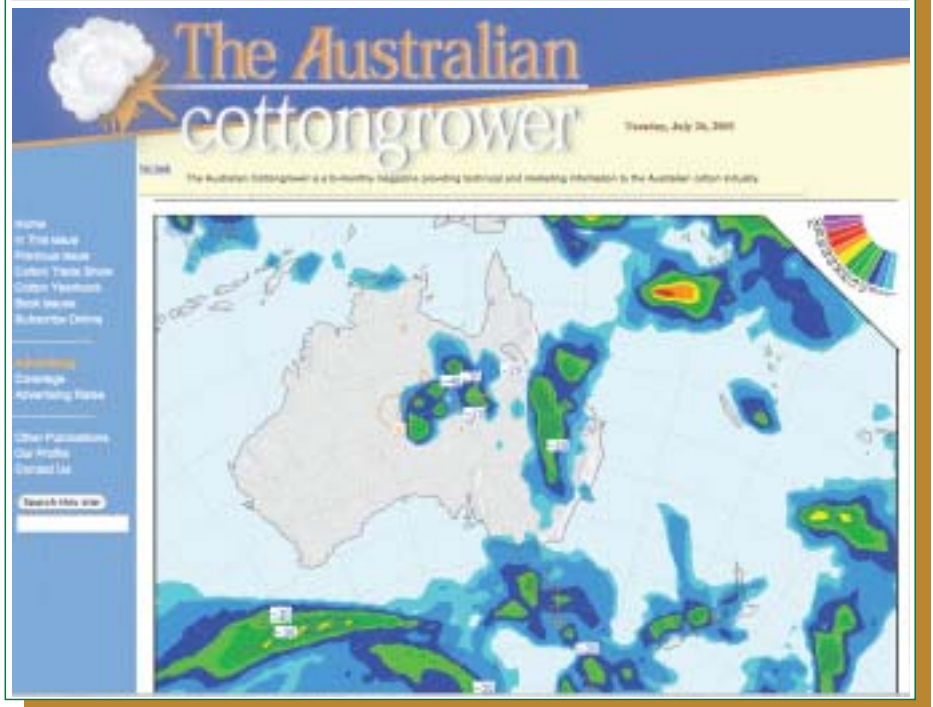
All of the medium term forecasts are based on one of a number of global weather (numerical) models which take a huge number of atmospheric measurements and crunch the numbers through a super computer to give forecasts for various parts of the globe. The output from these models is then used to produce 'user friendly' forecasts.

You may find different sites on the internet with totally different presentations of the data from the same model. And the important thing to remember is: the further out you go in time, the less accurate they are.

The first port of call should always be the seven and 14 day forecast maps (see Figure 2) from the Center for Ocean-Land-Atmosphere Studies (COLA) in the US. These use output from the US Global Forecast System (GFS — but also previously known as MRF and AVN) model and can be found under the 'Weather' button on the Cottongrower site or at <http://wxmaps.org/pix/prec7.html>.

If its rain you are interested in and there is no rain showing for the next seven

FIGURE 3: GFS forecast for July 31 as at July 26



days, then there is probably no need to look any further. The map for July 26, shown in Figure 2, predicts reasonable falls across NSW and Queensland over the period, but it doesn't say when.

To find that out, go to GFS under the "Weather" button which will produce a daily map of forecast rainfall for the next six days. In this example (Figure 3), we

can see rain predicted to start in inland Queensland six days hence (July 31).

Another US weather model is NOGAPS, developed by the US Navy. Note that the NOGAPS chart for July 31 (Figure 4) doesn't show nearly as much rain as the GFS chart.

The US Navy also produces an 'ensemble' set of forecast charts using a number of models.

Other charts which can be useful are produced by Metview.com in New Zealand and based on the US World Area Forecast System (WAFS) model (Figure 5). They only extend for three days, but are done in six-hour intervals.

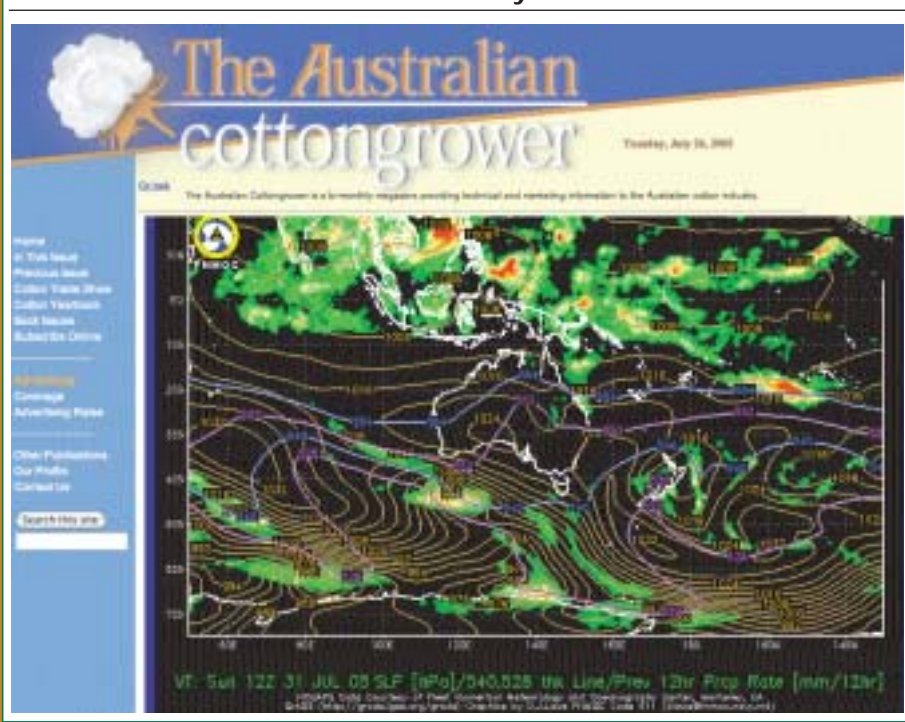
BOM models

The BOM does have some excellent models but doesn't present them well unless you are a registered user and willing to pay. The three models used by the BOM are GASP which extends for eight days; LAPS (three days) and Meso-LAPS, a more fine-tuned version of LAPS, which extends for two days.

While the BOM doesn't present this information well, the good news is that you can get it through a third party — Weatherzone (linked from the Cottongrower site or www.weatherzone.com.au). If you follow the link through "Computer models" on this site, you can get easy-to-read output from the BOM models.

Weatherzone (Figure 6) has a wide range of information freely available, but to get the full detail from these models, you need to become a 'Silver' member which

FIGURE 4: NOGAPS rainfall chart for July 31



costs all of \$60 a year — great value. Without a doubt, the Weatherzone and the BOM's own site are the best two sources of weather information on the internet.

Another feature of the Weatherzone are the meteograms which can be produced for just about every town in Australia and show a graphical projection of rainfall amounts, among other things, for the three BOM models plus GFS (see Figure 7).

Other models

There are a number of other global cli-

mate models including:

UKMET model. It is possible to get Australian forecast charts from the UK model through a site at the University of Wyoming (<http://weather.uwyo.edu/models/fcst/index.html?MODEL=ukmet>). This provides forecast charts for rainfall and other weather variables out for 72 hours.

European model. The ECMWF model is highly respected but shows only surface pressure and a couple of other variables for the Australian region for up to seven days. (http://www.ecmwf.int/products/forecasts/d/charts/medium/deterministic/msl_uv850_z500/).

Japanese model. A German site provides forecasts for up to five days out based on the Japan Meteorological Agency (JMA) model (<http://www.wetterzentrale.com/topkarten/fsjmaeur.html>)

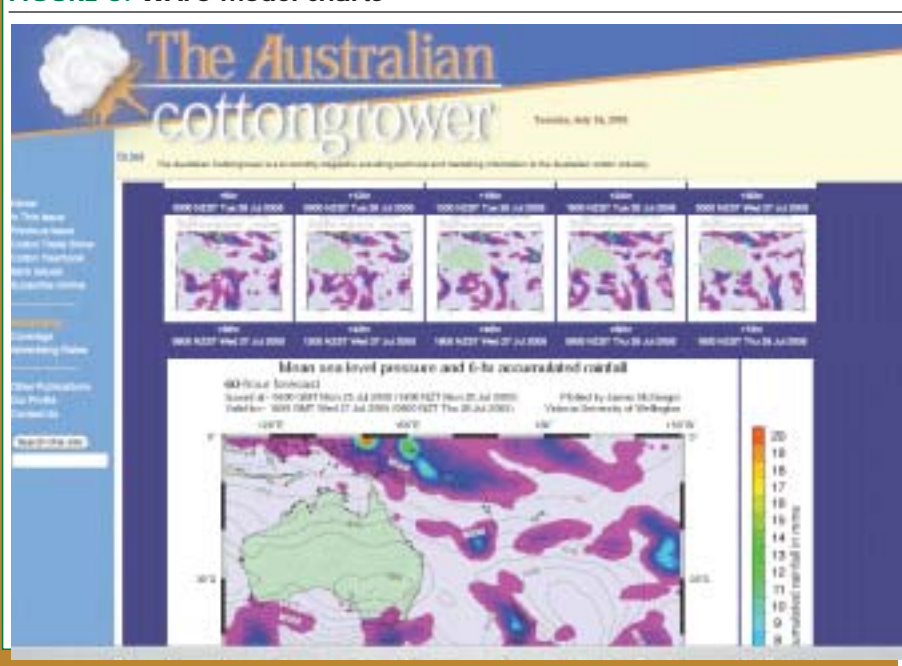
Extended views

If you want to look a bit further forward than a fortnight, both the BOM and the Queensland DPI (Long Paddock) give seasonal outlooks, based partly on SOI information. If you follow the SOI, the Long Paddock site gives the best information.

To get a map of the latest sea surface temperatures in the Pacific, go to the 'SST anomalies' link under the 'Weather' button on the Cottongrower site.

To get a global view of the state of play regarding El Nino predictions, go to the BOM site: Seasonal Outlooks: Survey of International ENSO prediction models.

FIGURE 5: WAFS model charts



This gives the predictions from 12 global ocean circulation models for Pacific Ocean temperatures over the following nine months.

After the rain

When it does rain, it's always helpful to see how much has fallen and where the water is going. The best place for that information is at the BOM, although Weatherzone also has good links to automatic weather stations.

The BOM flood warning service (<http://www.bom.gov.au/hydro/flood/>) gives a map of Australia and shows, firstly, rainfall totals across the country for the 24 hours to 9.00 am (Figure 8). It also shows rainfall for the past hour and river conditions (flood levels).

If you zoom in to a State and then a regional view, the site provides rainfall totals since 9.00 am as well as three hourly rainfall totals. At this stage, you have the option of making the map 'clickable' which means you can get rainfall and flood levels for every river gauge and weather station.

Of course, when that rainfall starts to accumulate, you need to start looking at flows in the river and the rate at which the dams are starting to fill. In NSW, the site to go to is the DIPNR home page and follow the links to:

- Daily river reports which give river heights and flows including inflows and storage levels in dams; and,

FIGURE 6: The Weather Zone



- The NSW Storage report which is updated weekly and also gives historical information from the storages over the previous two years.

In Queensland, the site to visit is Sunwater (<http://www.sunwater.com.au/>) which gives excellent graphics for all storages in Queensland.

Other sites of interest

Some other weather related sites of interest, in no particular order, are:
 US National Weather Service

- <http://www.nws.noaa.gov/>
- Madden-Julian Oscillation (MJO) <http://www.apsru.gov.au/mjo/>
- Australian Weather News <http://www.australianweathernews.com/>
- Australian Severe Weather <http://australiasevereweather.com/>
- CSIRO Atmospheric Research <http://www.cmar.csiro.au/>
- Joint Typhoon Warning Centre <https://metoc.npmoc.navy.mil/jtwc.html>
- BOM Research Centre (BMRC)

FIGURE 7: A metogram for Trangie

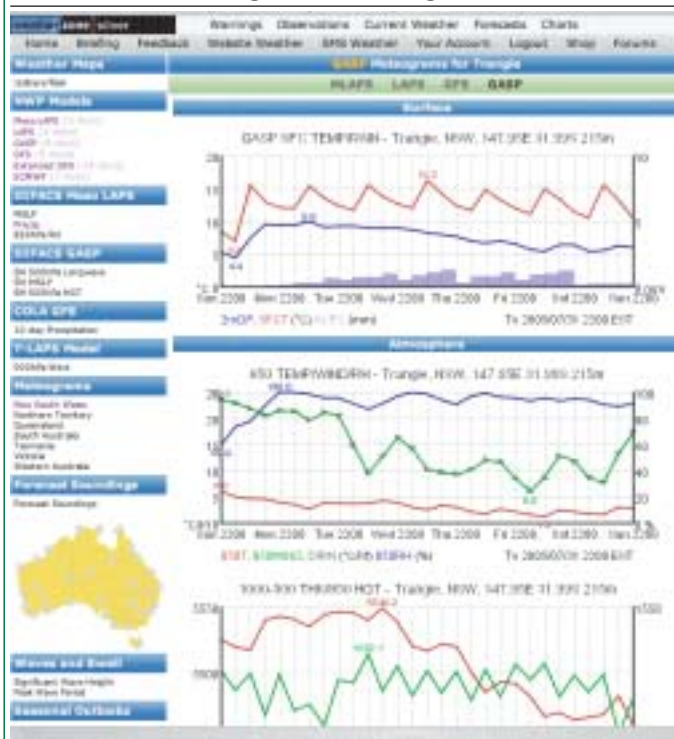


FIGURE 8: The BOM flood warning service

