

Generating fields of daily and 3-hourly precipitation probability on a high resolution grid, utilising a synoptic typing climatology

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1. INTRODUCTION

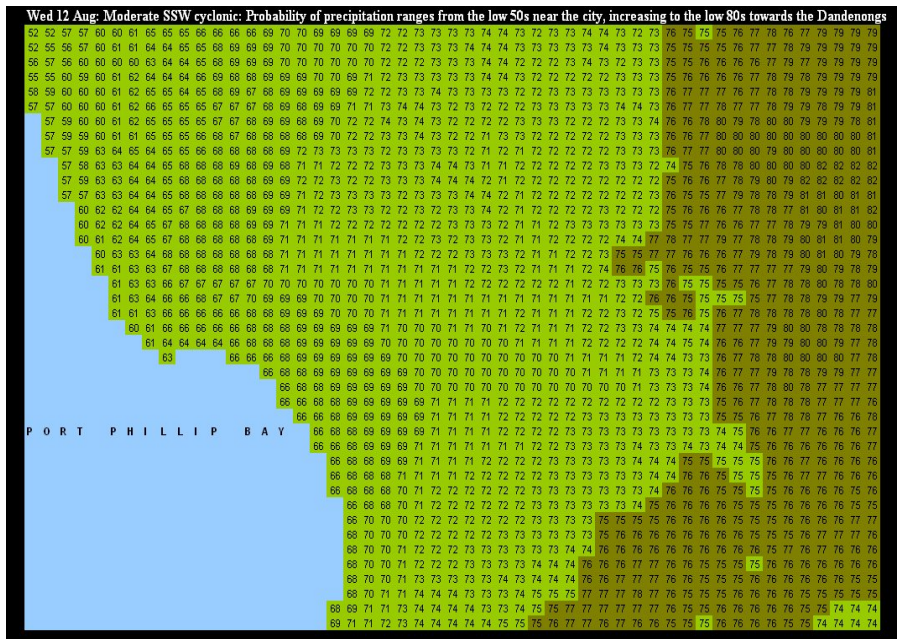
The Bureau of Meteorology's Next Generation Forecast and Warning System (NexGenFWS) project will extend a pilot forecasting system, recently introduced in the Victorian Region, to remaining Regional Forecasting Centres and the National Meteorological and Oceanographic Centre. The forecasting system to be rolled out is the Graphical Forecast Editor (GFE) adapted from the version used operationally in the US National Weather Service. Forecast information for any grid-point will be available via maps on the Bureau's website.

2. PURPOSE

In this context, the purpose of the current paper is to demonstrate, via a pilot scheme for Central Victoria, the generation of fields of daily and 3-hourly precipitation probability on a high resolution grid, utilising a synoptic typing climatology.

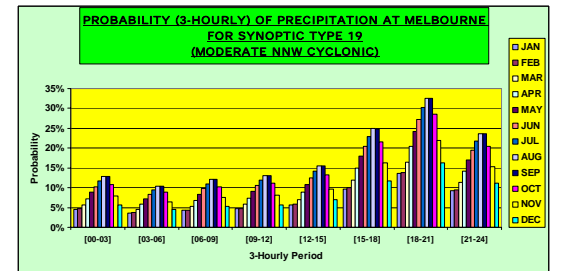
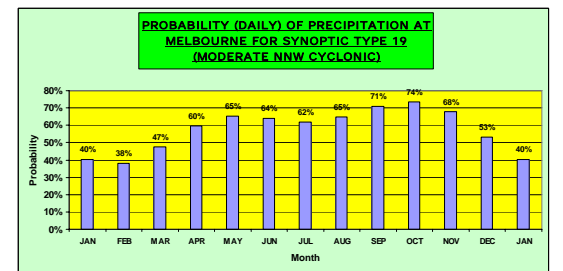
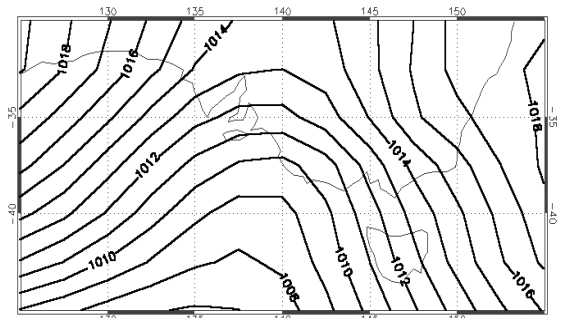
3. DISCUSSION

Daily precipitation probability grids (<http://www.weather-climate.com/SEpop.htm>) may be generated from probabilities forecast for 56 locations in Central Victoria, using synoptic type, MSL pressure gradient, 700 hPa relative humidity, and other parameters predicted by the NOAA Global Forecasting System NWP model.



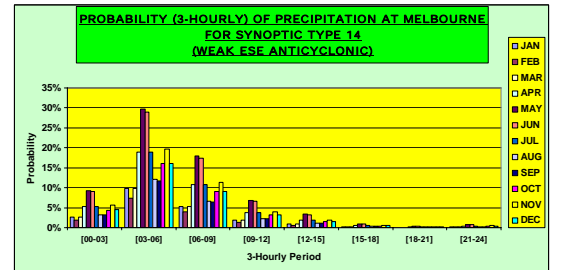
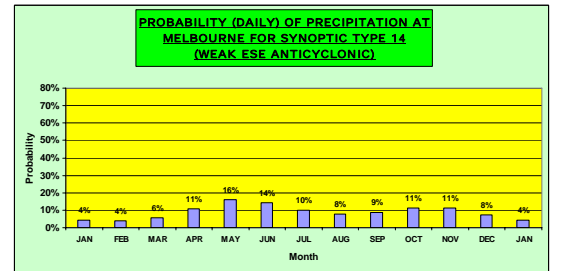
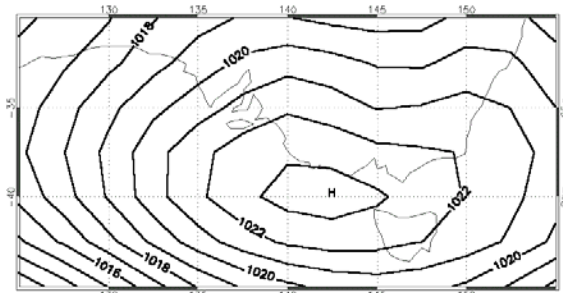
Synoptic Type 19

NCEP Mean Sea Level Pressure Analysis 00LUTC



Synoptic Type 14

NCEP Mean Sea Level Pressure Analysis 00LUTC



3-hourly precipitation probability grids may be similarly generated, by translating the daily grids into 3-hourly grids via regression relationships established between the synoptic type database and a 40-year Melbourne precipitation database.

It is now proposed to briefly illustrate, by means of two examples, how synoptic patterns influence the daily and seasonal distribution of precipitation occurrence.

Synoptic Type 19, *Moderate Cyclonic NNW*, is associated with precipitation in the Melbourne CBD on 59% of occasions. The chart is valid for 0000 UTC (10am EST) and depicts a frontal zone approaching Victoria from the west. As a result, precipitation accompanying this situation is more likely to occur during the late afternoon and evening than during the morning. Precipitation is also less likely to occur during the summer, than during the other seasons.

For example, taking the case where 1 mm of rain falls during the 24 hours, during August and September, there is a 33% chance of measurable precipitation with Synoptic Type 19 during the early evening between 1800 and 2100. By contrast, there is only a 4% chance of precipitation with Synoptic Type 19, during the early morning between 0300 and 0600.

By contrast, Synoptic Type 14, *Weak Anticyclonic ESE*, is associated with very little rain, there being precipitation in the Melbourne CBD on only 9% of days. The little precipitation that does accompany this situation is much more likely to occur during the early winter mornings, than during other seasons at other times during the day.

To illustrate, taking the case where 1 mm of rain falls during the 24 hours, during May and June, there are respectively, a 30% and 29% probability of measurable precipitation with Synoptic Type 14 during the early morning between 0300 and 0600. By contrast, for the 1500-1800, 1800-2100, and 2100-2400 periods, for all months, there is less than a 1% chance of precipitation with Synoptic Type 14.