

THE BACK-POCKET LOCAL WEATHER FORECASTING GUIDE

Ian Holton: 24th October 2000

There are many local daily forecasting aids available for the farmer in the paddock, or the vine person in the vineyard, or for any interested person.

Here are some simple forecasting aids and rules you can use to become a local daily weather forecasting expert:

Step 1(a): Obtain a local area forecast from a reliable source (e.g., Holton Weather Forecasting, the Weather Bureau, or your preferred weather provider).

Step 1 (b): If you have access to the Internet look at the weather information available, taking particular note of selected areas, such as those shown on the Holton Weather Forecasting Internet Site, (a) Australian surface weather map (b) Australian satellite picture, (c) the Weather radar, and (d) the Australian dew point map [Note, the higher the dew point, in general, the higher the likelihood of shower and thunderstorm rainfall occurring during the day).

Step 2: If the forecast is for showers, thunderstorms or rain developing during the day, and if these are not already occurring, then there is much to be learnt by observing the sky and cloud patterns above.

Step 3: If there are layer clouds with turrets or towers protruding from out of the top (Strato-cumulus Castellanus or Alto-cumulus Castellanus), then that is a sign of atmospheric instability and of likely showery & thundery activity during that afternoon.

Step 3: If there are no clouds in the early morning, don't assume that the forecast showers, thunderstorms or rain will not occur. In the early morning the atmosphere is usually stable and there are no thermals (rising currents of warm air) to form clouds. By mid to late-morning the sky will often turn from clear to cloudy as the rising thermals form puffy cumulus cloud.

Step 4: If there are clouds, line-up the cloud edges with a shed wall, ute roof, post, or tree, and notice the way from which cloud is approaching you. This will determine the direction that any showers or thunderstorms will generally approach you from during the day.

Step 5: If there are two or three cloud layers, each higher than the other, the direction from which the second highest cloud layer (generally middle level cloud) approaches is the best direction to note. This direction is the most likely one that a shower or thunderstorm will approach you from during the day. This direction will often not be the same as the surface wind direction.

Step 6: Frontal showers and thunderstorms are normally strongest if a cold front is arriving in your area in the mid to late afternoon, or early evening. Frontal thunderstorms are weakest from around about an hour or two after sunrise to near mid morning. The timing of

the front in your area can make the difference between a good rain and little or no rain. If you are near the coast this particular daily frequency/strength variability cycle may not be so noticeable. Also, if the front is quite strong this daily frequency/strength variability cycle may be weaker or not occur at all.

Step 7: A VERY RELIABLE AUSTRALIAN FORECASTING RULES THAT CAN BE USED WHEN THERE ARE TWO OR MORE CLOUD LAYERS PRESENT IS:

"If you stand facing the direction that the lowest cloud layer is approaching from, then, (a), if the higher cloud layers are approaching from the left, then the weather will deteriorate during the day, but, (b) if the higher cloud layers are approaching from the right, then the weather will improve during the day. The nearer the angle to 90 degrees then the greater will be the effect. (e.g. If the lowest cloud layer is moving from the West, and middle and/or upper cloud layers are moving from the South = deterioration of the weather)."

Step 8: The greatest deterioration of weather in southern Australia will occur when the lowest cloud layer is approaching from the NE, the humidity is high (ie. Dew points are high), and the middle and high cloud is streaming in from the NW direction. If this particular situation is noted in the morning in your area, watch for heavy rain and/or thunderstorms developing during the day.

Step 9: The greatest improvement of weather in southern Australia will occur when the lowest cloud is approaching from the SE, the humidity is low, and the middle and/or high cloud layers are moving from the SW.

Step 10: Take note of the following extra "Rules";

SHOWERS

(a) If you are near the coast the highest frequency of stream showers (in the absence of fronts) is overnight and in the morning. If the wind is running parallel to a gulf area or sea inlet area, showers will often form running up the gulf or sea inlet overnight. This is due to convergence from cold air draining into the gulf or sea inlet from each side. If you are inland the highest frequency of stream showers is in the mid to late afternoon and early evening.

SHOWERS AND THUNDERSTORMS

(b) Areas near the coast are greatly affected by shower and thunderstorm development on the daytime sea-breeze front. Strong shower and thundery activity can develop on this sea-breeze front as it moves inland, especially if the surface wind is coming from an off-shore direction. Also, land peninsulas where sea-breezes move in during the afternoon from each sea coast and collide together, are good shower and thunderstorm development areas.

(c) Near a range of hills, the best situation for afternoon showers and storms is when the gradient wind is running down the range, rather than across the range. However, if the wind is not flowing along the range, watch out for lines of showers and storms moving in from the surrounding plains areas.

(d) If approaching puffy cumulus clouds develop large vertical extent and start to become white and fibrous on top, showers are likely. If white fibrous anvil shapes develop on top of the clouds, thunderstorms are likely.

(e) Just after dark on a thundery day often renewed strong activity starts to occur. This is because the cloud tops are destabilised by radiant nocturnal cooling leaving the cloud top surface. And, at the same time, cloud bottoms are receiving the addition of radiant heat from the ground below. This process can also lead to the development of nocturnal thunderstorms inland around midnight onwards. This effect ceases abruptly around sunrise as the morning sun rapidly heats the cloud-tops.

(f) Showers and thunderstorms form over warm ground, but then propagate away from the storm. This happens as cooler air moves outwards from the central precipitation area. Watch out for storms developing on the edges of this cold outflow boundary. If two neighbouring storms have cold outflow boundaries that collide together, then large rapid new strong thunderstorm development may well occur at and near the collision area.

(g) A green colour under the base of thunderstorm or shower cloud indicates hail. Take care!

(h) A storm moving to a right or left direction from the movement of all other shower and thunderstorm clouds is a severe storm. Ragged clouds rotating from the bottom of a severe thunderstorm indicate tornado activity. Take great care!

(i) Showers and thunderstorms tend to form into lines perpendicular to the flow in the mid to late afternoon. They can then propagate forward as mini-cold fronts well into the evening.

(j) Showers and thunderstorms often tend to form as cloud-streets running parallel to the wind direction from a particular ground feature, i.e. hill, river, forest, etc. In this situation they may cause heavy rainfall over the same area for hours, while none or little at all falls just a few kilometres away.

RAIN

(k) Rain from layer cloud often is at a maximum around the early morning period, and then breaks up and clears during the late morning. This occurs as the morning sun heats the top of the cloud layer. However, if a cold front is approaching this rule will not always apply.

(l) Rain is more likely to occur if the grey sheet of rain-cloud has darker lower cloud patches just beneath it.

(m) Rain is generally long-lived fairly steady precipitation from layer cloud. A Shower is generally short-lived, rapidly changing precipitation from cumulus cloud. The amount of rainfall you get from rain does not necessarily exceed that from a shower. A short heavy shower may well produce more rainfall than a much longer period of light rain.

(n) If a strong wind is blowing across a range, most of the rain will form on the windward side of the range. This occurs as the moist winds are forced up over the hill, and cloud and then rain form. The leeward area may be in a rain-shadow area all day in this situation, and may get little, if any rainfall. Here, the downward flowing winds dissipate the cloud and associated rainfall. These types of rain-shadow areas may get no rain until a front or a change in wind direction occurs (e.g. Well known rain shadow areas such as those, East of the MT Lofty Ranges of SA in a strong NW flow; the Cowell area of SA in a strong NW flow; the Donald area of Victoria in a strong SW flow; & the Geelong area of Victoria in a strong W/NW flow.)

WIND

(o) Wind is generally lightest during the late evening, overnight and early morning. This is when cool air near the ground dislocates itself from the warmer gradient wind which is flowing aloft. As the sun warms the earth in the mid-morning, the near ground air also warms. This warming near ground air then starts to mix with the gradient wind above. This brings the higher wind back to the surface once more.

(p) The wind generally reaches its' maximum strength in the late morning and early afternoon before convection heating tends to break up the wind flow. Near the coast the regular afternoon sea-breeze reaches its' maximum strength about mid to late afternoon, before dying away as night falls.

(q) If the wind is opposing the sea-breeze, the sea-breeze will normally be weaker and have less inland penetration than normal. However, if the wind is already blowing from the sea, it will generally make the afternoon sea-breeze stronger and it will penetrate further inland.

(r) There is often a wind lull an hour or so before the front passes your area. Don't be fooled by this wind lull. The front will soon reach your area, and the wind will return as it switches to a more anti-clockwise direction.

(s) If the wind is flowing over a hill barrier, areas to the windward of the flow will drop in wind speed overnight. Whereas, areas to the leeward of the hill barrier, will reach a down slope cool air gravity induced maximum during the nocturnal hours. This down slope flow is often strong and gusty, but will generally only exist for a few km's leeward of the hill barrier. In this situation, FROST will be far more likely windward of the hill barrier, and also well leeward of the hill barrier, past the strong leeward wind area, where the wind once again becomes light.

FROST

(t) Frost temperatures are reached when the dew points (a commonly used measure of the amount of moisture in the air) in your area are low. If the dew point map, on the Holton Weather Site Links Page, shows 3pm (05UTC) dew points lower than 4 or 5 degrees C, frost is possible that night. If they are lower than 1 or 2 degrees C, a heavy frost is likely.

(u) However, cloud cover will prevent a frost in your area, as the bottom of the cloud layer prevents radiant heat escaping and itself sends heat rays back to the ground surface. A night breeze will also help prevent frost occurrence.

(v) The worst frost situation will occur if there has been an extended dry period before the frost event. Also, when a dry cold outbreak moves up rapidly from the Antarctic area, especially when there is little or no rain accompanying the cold front. Here "black" frosts, where no protective dew or water covers the leaves, flowers, grain or fruit, can burn and kill plant and fruit tissue easily. Dew points below minus 1 or 2 degrees C at 3pm (05UTC) indicate that a heavy or "black" frost may well occur.

(w) Frost is normally worst in low basin areas where cold air drains at night. Slopes and hill areas often miss the worst of the frost, as the cold frosty air drains away by gravitational pull to lower topographical areas.

Step 11: You are now a local daily short-range weather expert. Keep this guide in your back-pocket and put your new expertise to good use. However, if in doubt about the daily weather, or if you are doing or planning any important agricultural work, please ring Holton Weather Forecasting, or your preferred weather provider.

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