



Core units: Inquiry and skills

Illustration 1: Weather maps and climate graphs – Year 7

Weather maps

A weather map (or synoptic chart) is a graphic representation of the weather conditions being experienced across part of the earth's surface at a particular point in time. It includes information about air pressure and the distribution of rainfall. This enables us to predict what type of weather we are likely to experience over the next two to three days.

With the aid of weather maps and satellite images, meteorologists are able to forecast likely weather conditions over a period of up to four days. They can also identify hazardous weather conditions, including storms, gales, hail, temperature extremes and cyclones.

Australia's Bureau of Meteorology website <www.bom.gov.au> provides a wealth of information about weather and climate. Of particular interest are:

- weather (synoptic) maps/charts
- weather forecasts, warnings and observations
- radar images showing the intensity of rainfall
- satellite images
- rain and temperature maps
- climate averages and long term climate data for communities across Australia.

The latter is particularly useful for the construction of climate graphs.

Reading weather maps

Shown below is a four-day Bureau of Meteorology forecast map. These maps show the projected atmospheric conditions over the next four days. Maps are prepared for both 10.00 am and 10.00 pm. Once you can interpret such maps you can get an idea of the weather conditions that are likely to prevail in different parts of Australia.

The maps and images featured in Figures 1–4 are typical of the Australian summer. Low pressure systems dominate northern Australia, bringing what is known as the Big Wet. The southern part of the continent is dominated by high pressure systems with the occasional passage of a cold front that moves from west to east just to the south of the continent. These sometimes sweep up the coast of south-east Australia bringing relief from high temperatures. Frontal thunderstorms often accompany the passage of the front.

In winter, the high pressure systems migrate to the north, bringing stable atmospheric conditions and a dry winter to the north of the continent. The low pressure systems, which sweep to the south of the continent in summer, also move to the north, bringing unsettled conditions to the southern part of the continent.

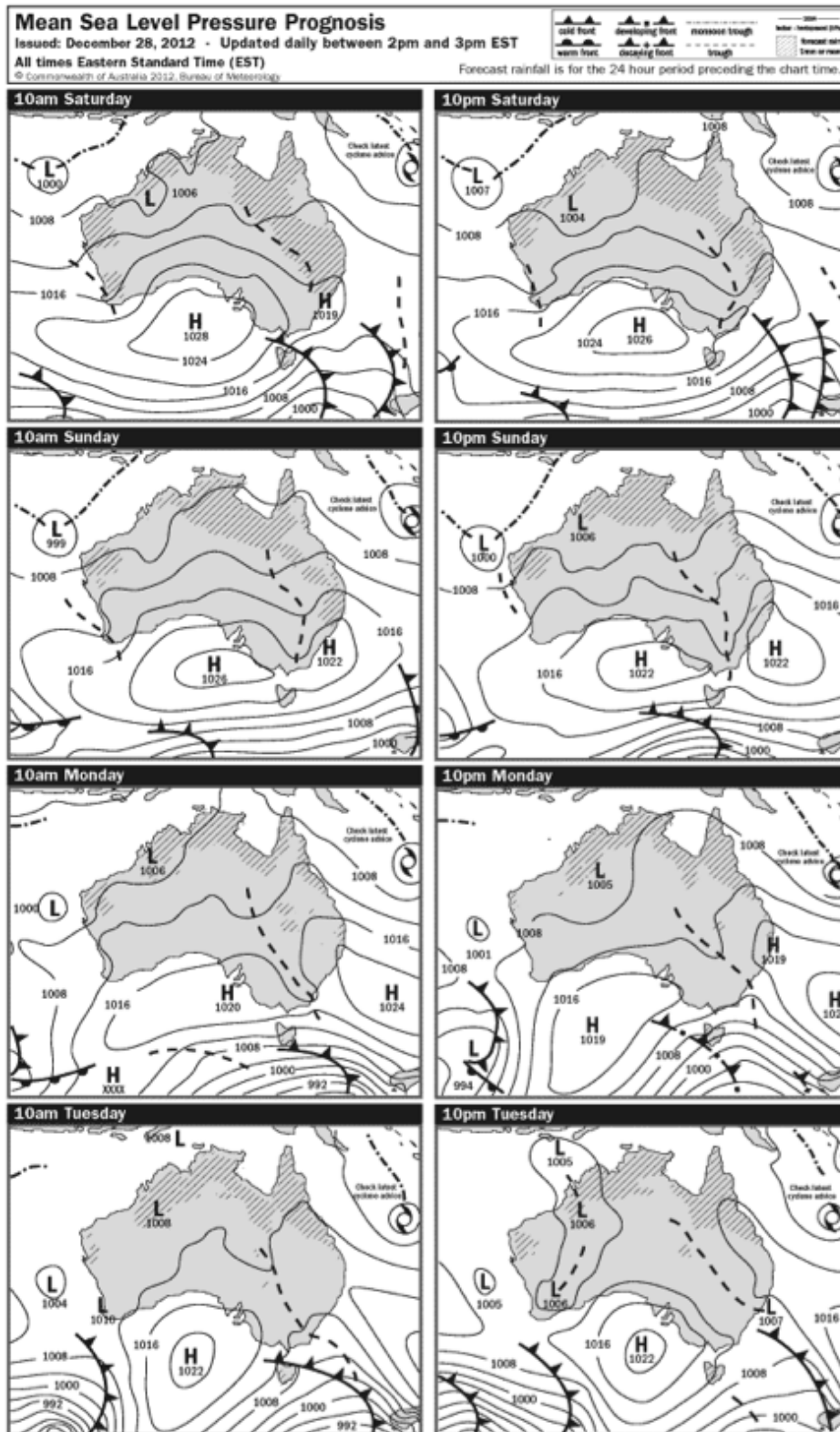


Figure 1: Bureau of Meteorology four-day forecast weather map

Source: Australian Government. Bureau of Meteorology. Retrieved January 2013, from: http://www.bom.gov.au/australia/charts/4day_col.shtml

© Commonwealth of Australia 2013, Bureau of Meteorology.

Shown below is a Bureau of Meteorology short-term forecast weather map. These maps provide a snapshot of atmospheric conditions at a particular time.

Isobars: Isobars join places with the same atmospheric pressure. ¶
¶
¶
¶

High pressure: High pressure systems are typically characterised by stable atmospheric conditions—gentle winds, clear skies and little chance of rain. ¶
Air pressure increases towards the centre of the pressure system. ¶
Air flows out from the high pressure system in an anticlockwise direction. ¶
¶
¶
¶

Cold fronts: Cold fronts occur when a mass of cold, dense air pushes in under a mass of warm air, forcing it to rise. As the warm air rises, it cools and condensation takes place. ¶
Lower temperatures are experienced once the front has passed. ¶

Low pressure system: Areas of low atmospheric pressure form when warm air rises rapidly. They are typically associated with unstable weather conditions—cloudy skies, rain and relatively strong winds. ¶
Air pressure decreases towards the centre of the pressure system. ¶
Air flows in an anticlockwise direction of the low pressure system in the Northern Hemisphere, and in a clockwise direction in the Southern Hemisphere. ¶

Rainfall: Areas that have received rainfall are shown by shading or cross-hatching on the four-day forecast weather maps. ¶

Wind: Winds are strongest where isobars are close together. It is useful to know that winds occur when air moves from areas of high pressure to areas of low pressure. ¶

***Atmospheric pressure** is the weight of air pressing down on the earth's surface. If air is warmed, it expands, rises and creates a low pressure area on the earth's surface. If air is cooled, it contracts, descends, and creates an area of high pressure on the earth's surface. Air pressure is measured in hectopascals (hPa). Isobars are usually drawn at intervals of 2 hPa. ¶

Figure 2: Bureau of Meteorology short-term forecast weather map

Source: Australian Government. Bureau of Meteorology. Retrieved January 2013, from: http://www.bom.gov.au/australia/charts/msl_36hr_forecast_bw.shtml

© Commonwealth of Australia 2013, Bureau of Meteorology.

Rainfall forecast maps

Rainfall forecast maps are produced using computer models. They show the anticipated pattern and amount of rainfall for the next 24 hours.

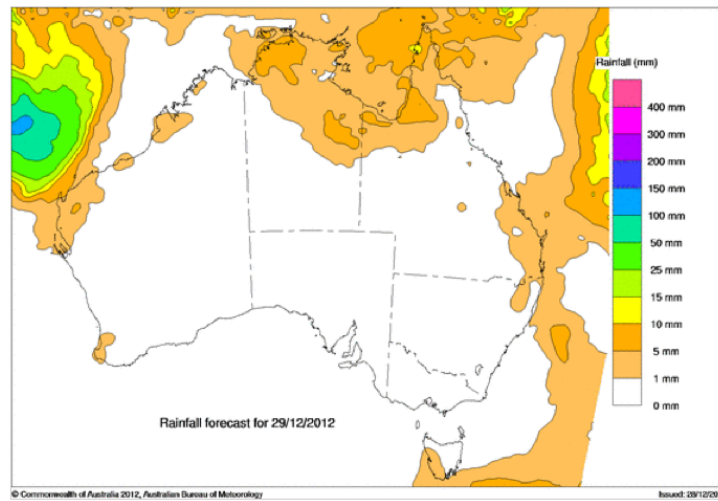


Figure 3: Bureau of Meteorology rainfall forecast map

Source: Australian Government. Bureau of Meteorology. Retrieved January 2013, from: <http://www.bom.gov.au/jsp/watl/rainfall/pme.jsp?ref=fr>

© Commonwealth of Australia 2013, Bureau of Meteorology.

Satellite images

Data from a series of geostationary satellites operated by the Japan Meteorological Agency provide excellent coverage of Australian. These satellites, situated over the equator at approximately 140°E (Central Australia), provide the basis for images used by the Australian Bureau of Meteorology

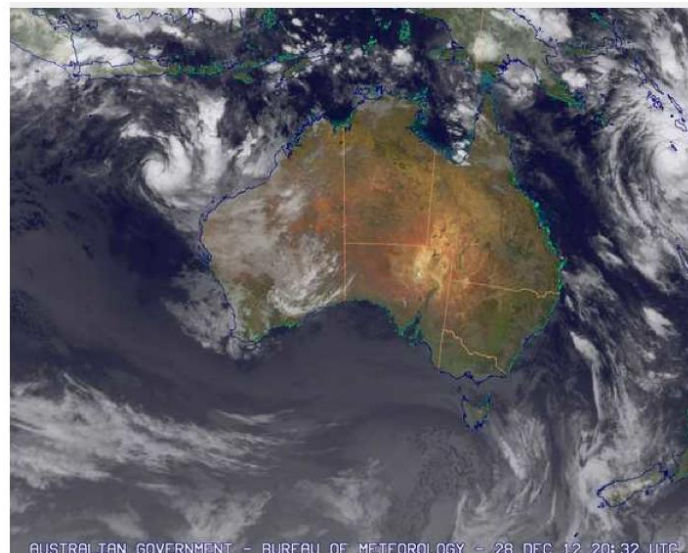


Figure 4: Satellite image of Australia showing weather conditions

Source: Australian Government. Bureau of Meteorology. Retrieved January 2013, from: <http://www.bom.gov.au/australia/satellite/>

© Commonwealth of Australia 2013, Bureau of Meteorology.

Activities

Use the Bureau of Meteorology website <www.bom.gov.au> to support these activities.

1. Download a copy of today's four-day weather forecast maps. Identify the position of the high and low pressure systems. Track their movement over the course of the four-day forecast. What is the general pattern of movement?
2. Watch the Bureau's satellite image animation showing the movement of air within the atmosphere. Write a paragraph or two describing the movement between high and low pressure systems.
3. Download a copy of today's weather forecast map and the current satellite image. Write a paragraph comparing the pattern of cloud cover shown on the satellite image to the distribution of weather features on the weather chart.
4. Study today's forecast weather map. Predict what the weather will be like tomorrow. Review your predictions in your next geography lesson.
5. On a wet day in the place where you live, access the Bureau of Meteorology's online radar images. Describe the distribution and intensity of rainfall in the area covered by the image. Use the map's loop function to determine in which direction the rain is moving.
6. Select a world city you would like to visit when travelling overseas. Use the Internet to investigate the weather conditions being experienced by the city. Write a brief report describing these conditions. Download any relevant weather maps and satellite images. Use these to illustrate your report.