



Balloon-based weather observations

Requirement

Balloon-based weather observations provide precise measurements of temperature, pressure, humidity, wind speed and direction, and can reach an altitude between 16km – 35km in the upper atmosphere. These observations provide vital information which enhances our understanding of the climate, and is used by the Bureau of Meteorology in forecasts and warnings to protect life and property in Australia.

The Bureau also has international obligations under the Convention of the World Meteorological Organization (WMO) to provide weather and climate-related measurements of the upper atmosphere.

Worldwide, weather balloons are released from approximately 1300 locations each day. The Bureau releases about 56 per day, or about 20,000 per year, from 38 locations within Australia and its offshore territories including Antarctica.



Photo 1 – Weather balloon and attachments, released by weather observer
Photo credit: Bureau of Meteorology, 2009

What to do if you find a filled or partially inflated weather balloon?

Call 000 and ask for Fire Brigade assistance

- The Bureau uses hydrogen gas to fill its weather balloons. Hydrogen can be explosive when exposed to an ignition source such as a flame, electromagnetic signal or even low level static electricity.
- If you find a weather balloon that is still inflated, even partially, that means hydrogen is present in the balloon and it is **HIGHLY FLAMMABLE**.
- Keep at least 10m away and do not approach the balloon.
- Call Emergency Services (000) immediately and ask for Fire Brigade assistance.

Balloons that have burst do not pose an immediate risk and can be handled. They may appear very torn and shredded.

Other items that may be attached to a balloon that do not pose a risk includes:

- A foil-coated cardboard target shaped like a 4-sided pyramid (picture 1). This is used to slow descent of the balloon and/or track the balloon via radar.
- A small white plastic box known as a radiosonde. This has the sensors used to measure meteorological variables
- A parachute, used to slow descent when a target is not used;
- A torch, used for some night balloon releases.

All of these items can be disposed of with normal household garbage and recycling.

Do not burn or incinerate the radiosonde.



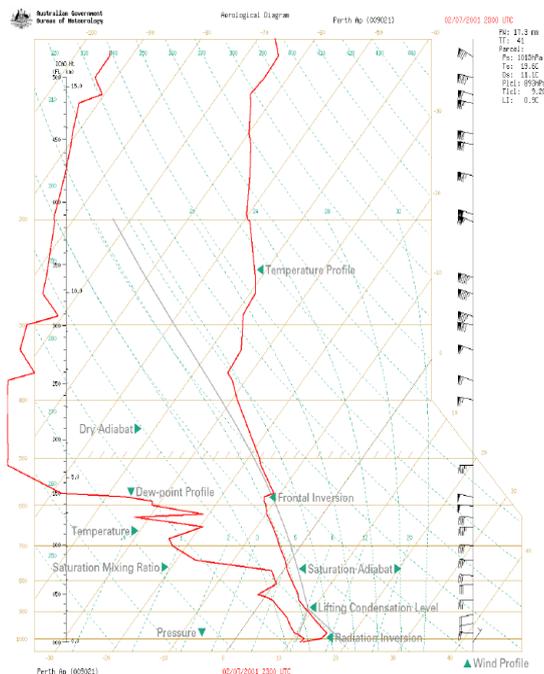
Photo 2 – Radiosonde, with Bureau label including how to dispose of radiosonde.



Additional information

Released from the ground, radiosondes are devices that are used to measure meteorological elements. A weather balloon filled with hydrogen gas carries the radiosonde into the upper atmosphere, along with additional items including a cardboard target (as seen in picture 1), and potentially a parachute and a torch.

Depending on the size of the balloon, the expansion that takes place as it rises into lower pressure causes the balloon to burst and the instrument will descend back to Earth. During the radiosonde's flight, it constantly transmits atmospheric temperature, humidity and pressure data to receiving ground equipment. This equipment processes and converts the data into meteorological weather messages, and is also displayed as aerological diagram used by forecasters to assist in forecast and warning services. More information can be located [here](#).



A Skew-T-Log P aerological diagram depicting the vertical temperature, dew-point and wind structure over Perth on 3 July 2001.

Photo 3 – Aerological diagram

Minimising our environmental impact

The Bureau seeks to minimise its footprint on the environment wherever possible, and has undertaken a number of measures to reduce the environmental impact of weather balloon flights by:

- pursuing alternate upper atmosphere technologies;
- using more environmentally-friendly materials; and
- Working with suppliers to make continual improvements.

Although complementary technologies such as satellites and wind profilers are increasingly used by the Bureau, weather balloons remain a critical component of the observation network and will continue to play an important role during the next decade and beyond.

How to inform the Bureau if you find a balloon.

The Bureau is interested to know if you find a balloon. Of specific interest is the 10 digit alphanumeric serial number on the radiosonde located on the lower right hand corner. From this number, the Bureau can determine when the balloon was released and from what location. The radiosonde is a single use instrument and may be safely disposed with household waste.

To assist with reporting a balloon finding, go to the Bureau's feedback page, and search for '[I found a weather balloon](#)'. This will open a feedback form which you can complete and submit your findings to the Bureau.

Submit feedback [here](#)

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