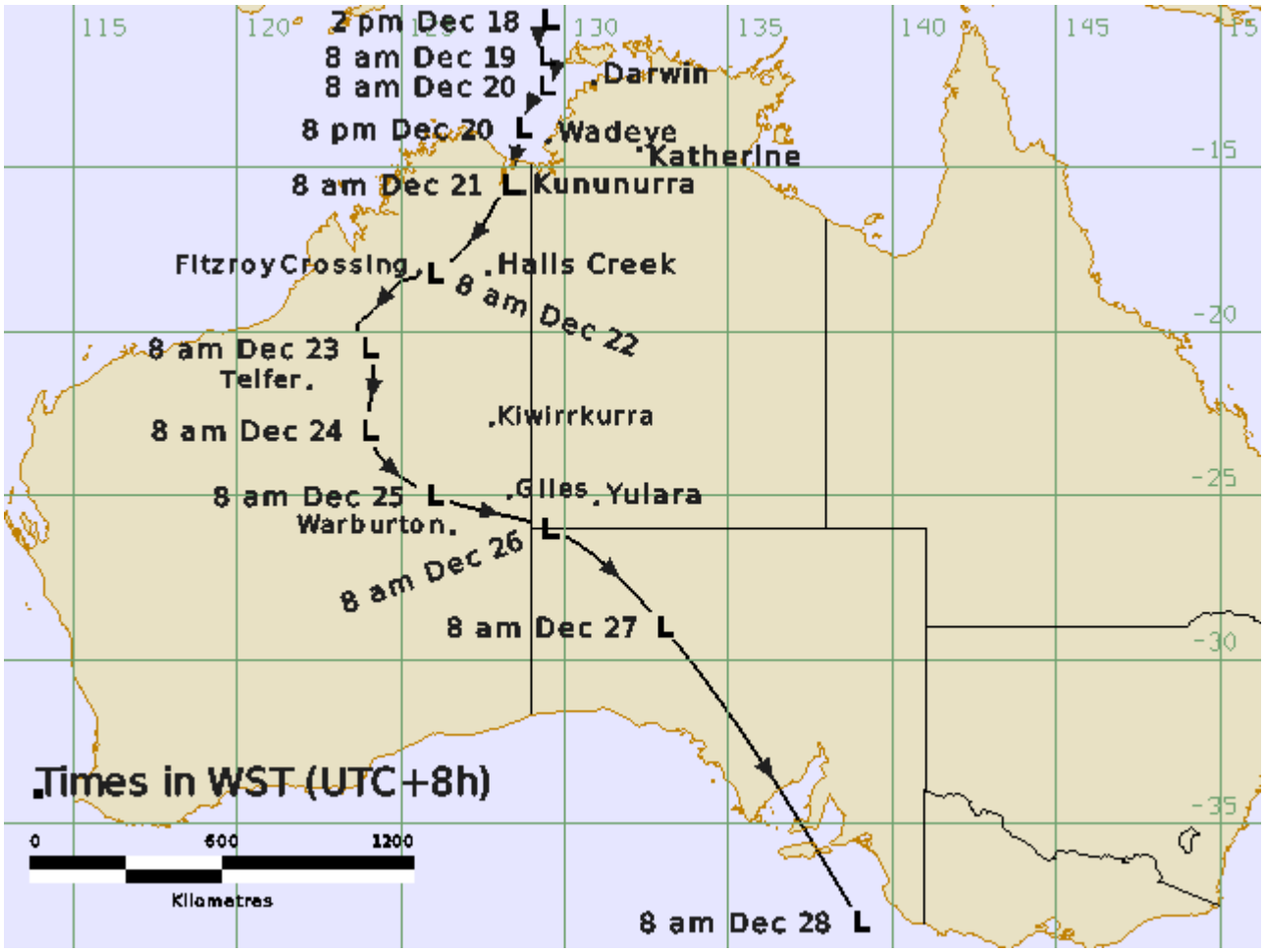
The Bureau of Meteorology

Tropical Low 06U 2016

18 – 28 December 2016

Joe Courtney, Tropical Cyclone Environmental Prediction Services



Revision history

Date	Version	Author	Description
29/03/2023	1.0	Joe Courtney	Final draft

Review status

Date	Version	Reviewer	Description
02/05/2023	1.0	Peter Clegg	Completed

Release history

Date	Version	Status	Approval
02/05/2023	1.0	Approved for release	Andrew Burton

Contact details:

Tropical Cyclone Team Lead

Severe Weather Environmental Prediction Services

Bureau of Meteorology

PO Box 1370, West Perth WA 6872

Email: tcwc@bom.gov.au

Published by the Bureau of Meteorology

Cover image: Track of Tropical Low 06U 2016 (times in AWST).

Table of contents

1. Summary

Tropical low 06U did not reach tropical cyclone intensity but was notable for the flooding rains it produced over central Australia.

The low formed in the Timor Sea on 18 December. It then moved south across the Joseph Bonaparte Gulf before crossing the northeast Kimberley coast near Wyndham overnight from 20 to 21 December. It failed to intensify into a tropical cyclone but retained tropical characteristics as it tracked over the Kimberley then over central Australia.

Heavy rainfall caused flooding across widespread areas of northern and central Australia. The community of Walungurru (Kintore) near the Western Australian/Northern Territory border recorded a 24-hour rainfall total of 231.6 mm including 81.6 mm in just one hour. The resulting flash flooding forced many residents to evacuate with an estimated 40 per cent of houses experiencing some damage.

Many roads were deemed impassable for some time.

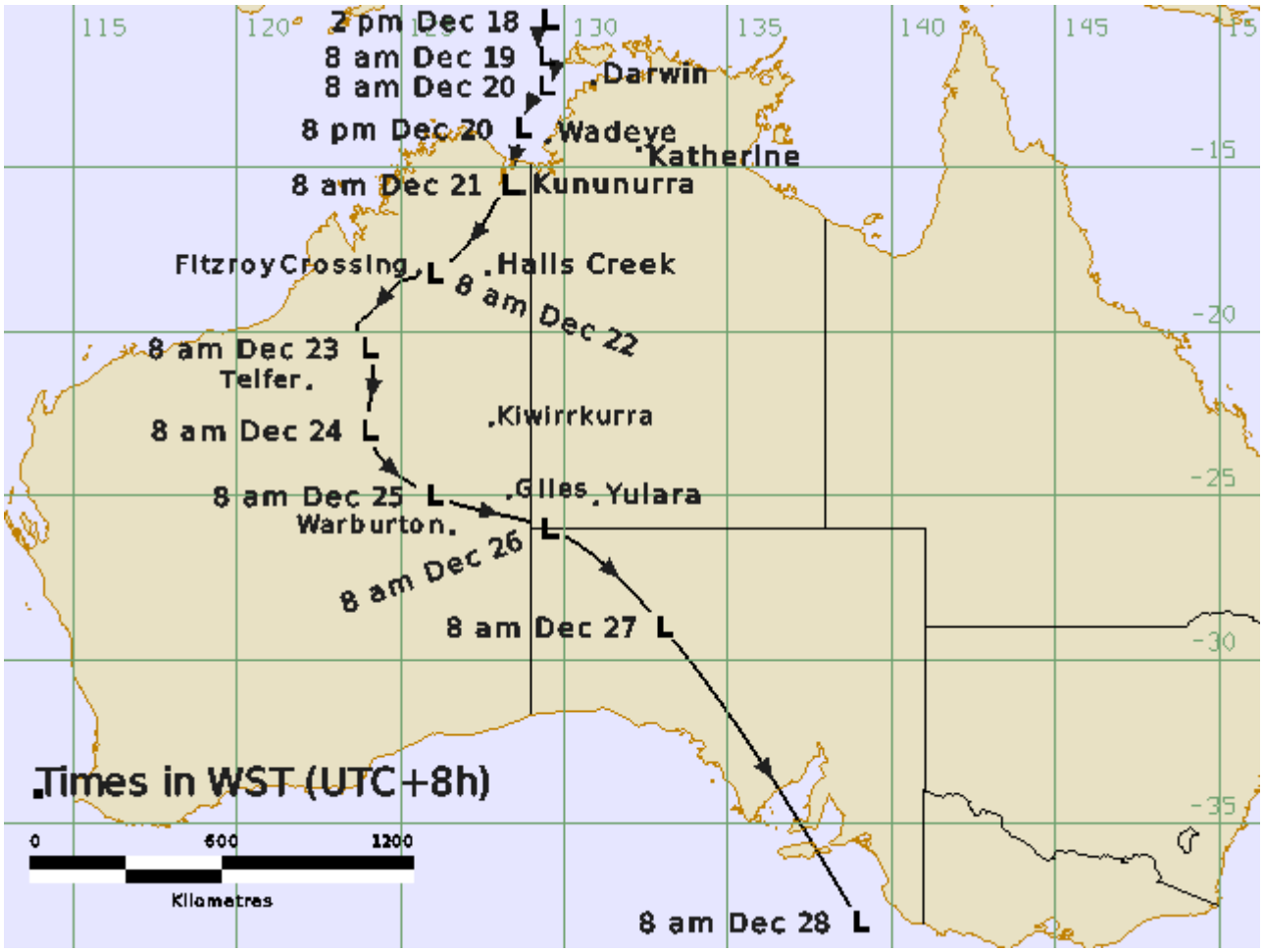


Figure 1. Track of Tropical low 06U (times in AWST, UTC +8).

2. Meteorological description

2.1 Intensity analysis

A low became evident on 18 December but was constrained by easterly vertical wind shear and failed to develop to tropical cyclone intensity before crossing the northeast Kimberley coastline. The Dvorak current intensity (CI) estimates reached 2.0 near landfall. As it tracked further to the south it retained a moist inflow from off the Kimberley coast and moved into a lower vertical wind shear environment, allowing it to retain tropical low characteristics. Figure 2 is the visible image at 0600 UTC 21 December showing a broad circulation. Giles recorded a maximum wind gust of 53 kn (98 km/h) at 0233 UTC 25 December.

It was tracked all the way to the south coast of South Australia on 28 December.

2.2 Structure

The circulation failed to consolidate into a tropical cyclone. The circulation remained broad as it moved overland as indicated in Figure 2

2.3 Motion

The low tracked to the south initially then southwest from 21-23 December then south again on 24 and 25 December. The dominant steering influences were the monsoon to the north, a low-mid level ridge well to the southeast and the circulation that became Tropical Cyclone Yvette that was generally located to the northwest. From 26 December the low accelerated to the southeast in response to an approaching mid-upper level trough to the west.

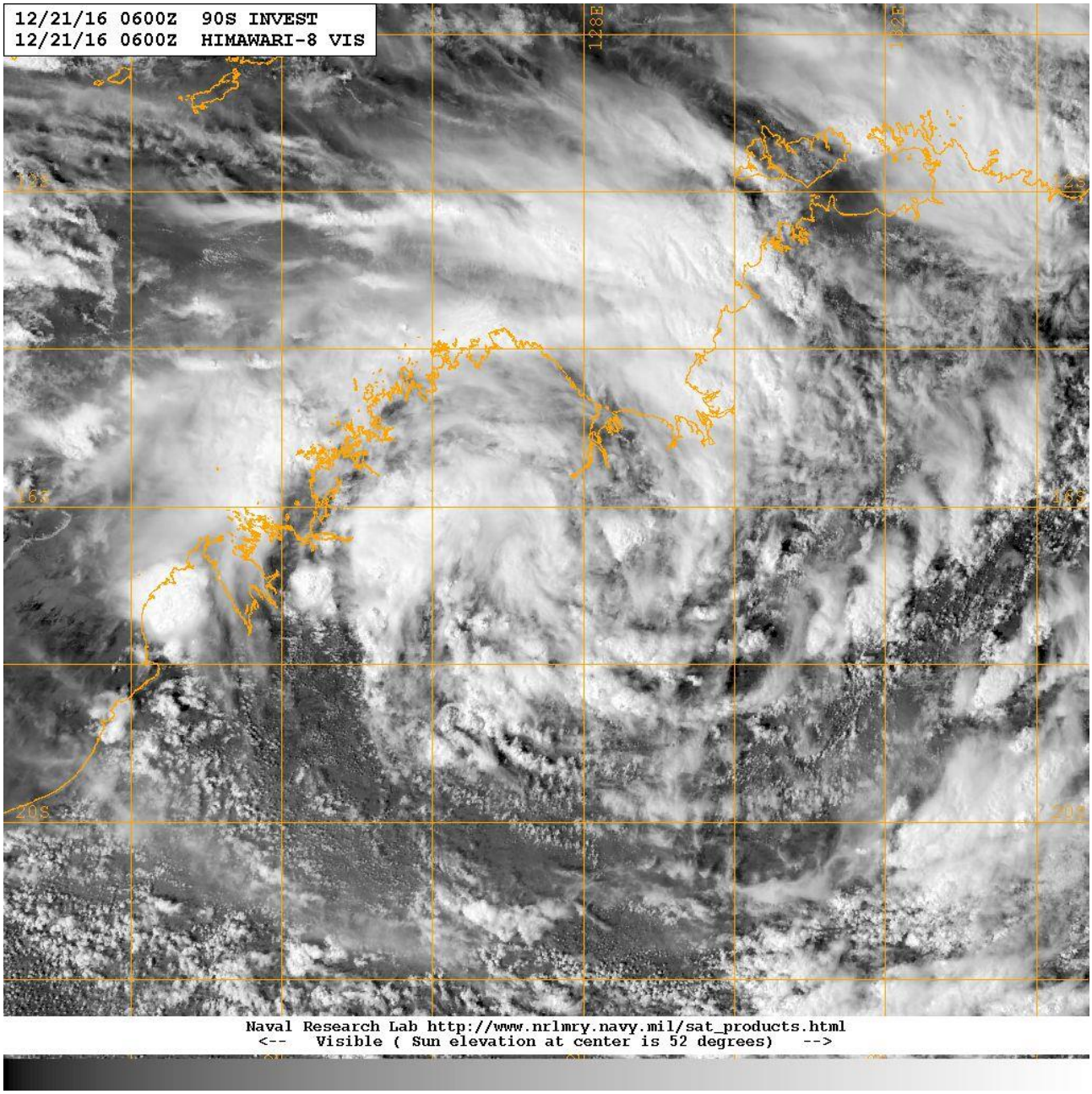


Figure 2. Visible image at 0600 UTC 21 December 2016 showing the centre of tropical low 06U over the inland Kimberley. Image courtesy NRL: https://www.nrlmry.navy.mil/TC.html

3. Impact

Heavy rainfall caused flooding to a large area from the Kimberley through inland WA and central Australia making many roads impassable.

Flash flooding at Walungurru (Kintore) community forced many residents to evacuate with an estimated 40 per cent of houses experiencing some damage.

Six people were rescued by helicopter after their vehicle was stranded between Kiwirrkurra and Kintore. Two tourists were rescued from floodwaters after their vehicle was swept off a causeway on the Hugh River near Alice Springs. Uluru-Kata Tjuta National Park was closed for a period

Source: ABC news https://www.abc.net.au/news/2016-12-26/uluru-closed-homes-damaged-by-flashfloods-in-central-australia/8148430 and https://www.theguardian.com/australia-news/2016/dec/28/tourists-who-went-missing-on-desert-hike-found-58km-from-group

4. Observations

4.1 Rainfall

Significant daily rainfall (24-hour period to 9am Local Standard Time (LST)) included:

21 December (WA): Theda 203.0 mm; Wyndham 160.0 mm; Wyndham Aero 141.4 mm; Home Valley 127.0 mm; Kalumburu 107.2 mm;

22 December (WA): El Questro 108.5 mm.

23 December (WA): Fitzroy Crossing 160.6 mm; Fossil Downs 99.0 mm;

24 December (WA): Cherrabun 129.0 mm

26 December (NT): Walungurru (Kintore) 231.6 mm; Curtin Springs 128.0 mm; Yulara 83.8 mm;

27 December (NT): Mount Denison 116.6 mm; Glen Helen Lodge 71.0 mm; Ormiston Gorge 70.0 mm; Coniston 51.0 mm.

Walungurru (Kintore) reported a one-hour total of 81.6 mm to 9:39pm ACST 25 December and a three-hour total of 148.0 mm to 10 pm ACST 25 December.

The weekly rainfall map to 27 December 2016 in Figure 3 shows a widespread area exceeding 200 mm across the Kimberley and in a region of central Australia. It is probable that these areas are joined but the lack of rainfall observations result in an erroneous region of nil rainfall across the interior of Western Australia.

4.2 Winds

Giles recorded a maximum wind gust of 53 kn (98 km/h) at 0233 UTC 25 December.

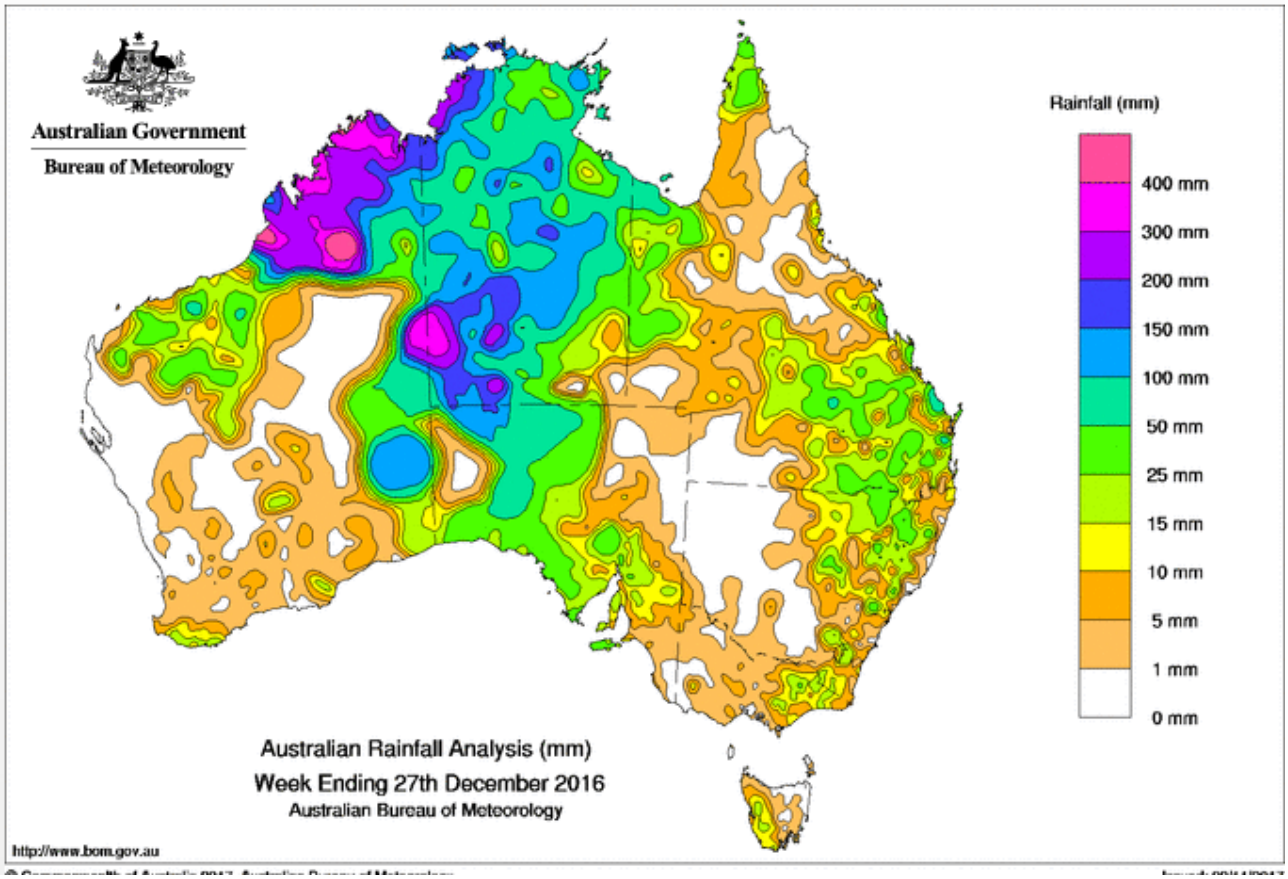


Figure 3. Weekly rainfall analysis ending 27 December 2016. Note that the zero rainfall through inland Western Australia is a reflection of lack of observations. Source: http://www.bom.gov.au/climate/maps/rainfall/?variable=rainfall&map=totals&period=week&region=nat&year=2016&month=12&day=27

5. Forecast performance

No tropical cyclone advices were issued for this system.

1. Appendix: List of abbreviations

Abbreviation	Term
ADT	Advanced Dvorak Technique
ACST	Australian Central Standard Time
AEST	Australian Eastern Standard Time
AMSR2	Advanced Microwave Scanning Radiometer
ASCAT	Advanced Scatterometer
ATMS	Advanced Technology Microwave Sounder
AWS	automatic weather station
AWST	Australian Western Standard Time
°C	Celsius
CI	Current intensity
CIMSS	Cooperative Institute for Meteorological Satellite Studies (USA)
CIRA	Cooperative Institute for Research in the Atmosphere (USA)
EIR	Enhanced InfraRed
ERC	eyewall replacement cycle
FNMOC	Fleet Numerical Meteorology and Oceanography Centre (USA)
FT	Final T-number
GCOM	Global Change Observation Mission
GHz	Gigahertz
GMI	Global Precipitation Measurement Microwave Imager
h	hour
hPa	hectopascal
HSCAT	Hai Yang 2 Scatterometer (HY-2B, HY-2C)
km	kilometres
km/h	kilometres per hour
kn	knot

LLCC	LLCC
MET	Model Expected T-number
METOP	Meteorological Operational Satellite
MJO	Madden-Julian Oscillation
mm	millimetres
MSLP	mean sea level pressure
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NRL	Navy Research Lab (USA)
PAT	Pattern T-number
RH	relative humidity
RMW	radius of maximum winds
RSMC	Regional Specialised Meteorological Centre
SAR	Synthetic Aperture Radar
SATCON	satellite Consensus
SMAP	Soil Moisture Active Passive
SMOS	Soil Moisture and Ocean Salinity
SSMIS	Special Sensor Microwave Imager/Sounder
TC	Tropical Cyclone
TCWC	Tropical Cyclone Warning Centre
UTC	Universal Time Co-ordinated