



Tropical Low (05U) 10-23 January 2014

A. Summary

A tropical low pressure system formed within the monsoon trough over the Arafura Sea on 11 January and developed into an intense monsoon low north of the Cobourg Peninsula in the NT on 13 January. The low moved south and tracked across the western Top End, then further inland along the WA/NT border during the next few days. The low brought heavy rainfall and squally monsoonal winds to the west and north coasts of the Top End and produced notable rainfall totals in the Daly, Carpentaria, Gregory and Tanami districts.

The monsoon low structure improved as it tracked further inland and continued to deepen to 990 hectopascals (hPa) by 18 January over the western interior of WA. The low then turned west and tracked across the Pilbara and Gascoyne districts, producing further heavy rain along its track.

Event rainfall totals in excess of 300 mm recorded over parts of the Tanami Desert represents around 70% of the average annual rainfall for those areas. Widespread rainfall across northern and central WA led to numerous recording sites breaking their highest daily rainfall records for summer. Localised flooding cut roads throughout the western Top End and inland parts of the NT and also washed out a stretch of the Katherine-Darwin railway.

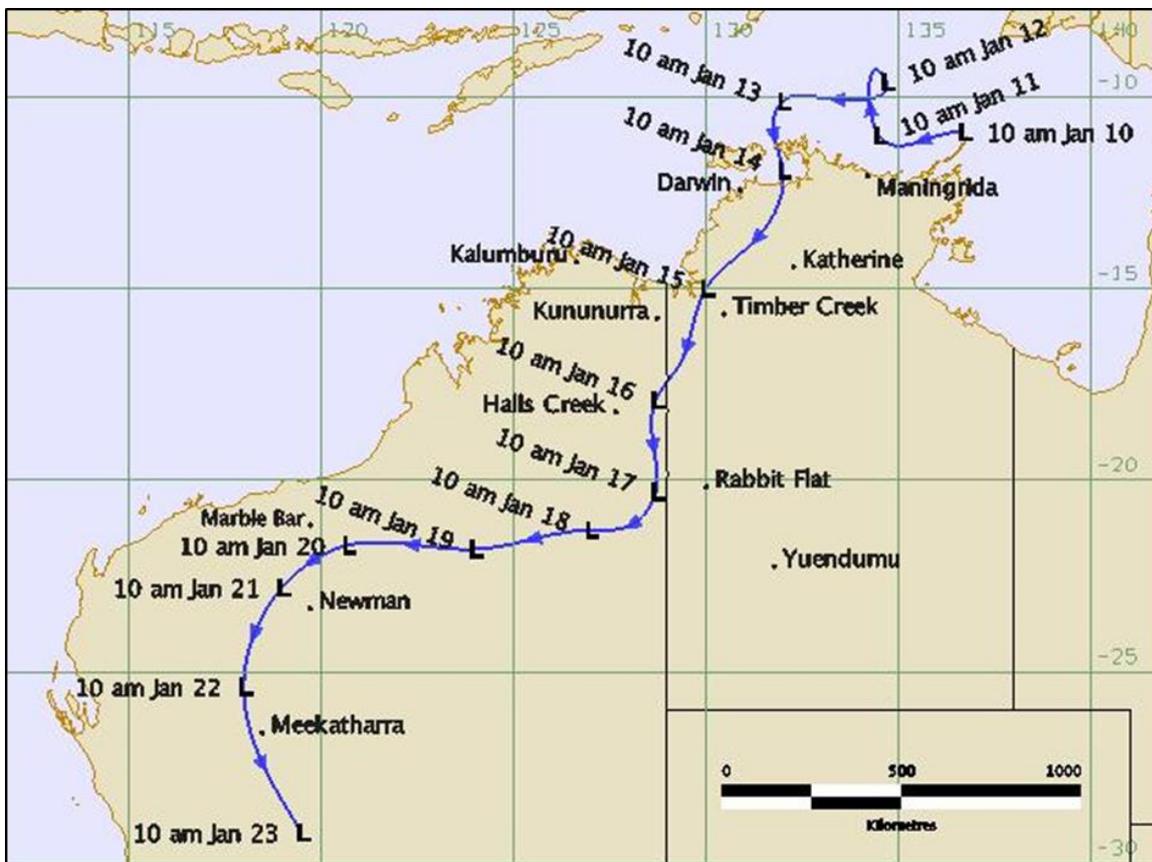


Figure 1. Best track of tropical low (05U) (10-23 January 2014)

B. Meteorological Description

A weak tropical low was first identified within a developing monsoon trough on Thursday 9 January 2014 to the northeast of Nhulunbuy in the NT. During the next few days, the low remained poorly defined as the monsoon trough deepened and became more organised over the Arafura Sea. Early on 11 January, thunderstorm activity became focussed around a developing circulation north of Maningrida and by 13 January, the low had deepened to below 1000 hPa and vigorous monsoonal northerly winds were affecting the north coast of the NT.

Land interaction and unfavourable upper winds prevented tropical cyclone development and the low took a southerly track across the Cobourg Peninsula and Van Diemen Gulf, making landfall near Point Stuart, about 100 km east of Darwin on 14 January. The low maintained its monsoon low structure as it tracked further inland during the next few days. At that stage, there was some risk that the low may move southwest into the Timor Sea where it could have developed into a tropical cyclone. As a result, Tropical Cyclone Advises were issued for coastal areas from the Tiwi Islands in the NT to Kalumburu in WA between 13 and 15 January.

Coastal regions including Darwin were affected by bursts of heavy, squally monsoonal showers for several days. Widespread and heavy rainfall developed over inland parts of the Top End on 14 January and extended into the Carpentaria, Gregory and Tanami districts during subsequent days as the low tracked southwards.

Despite being over land, the low pressure system continued to deepen as it moved south along the WA/NT border into the Tanami Desert on 16 and 17 January, dropping to a central pressure of 990 hPa on 18 January over the western interior of WA. The satellite imagery (Figure 2) showed significant signs of development with curved bands of deep convection around the low centre and strong anticyclonic outflow in the upper atmosphere as it moved under an area of favourable upper winds .

The intense monsoon low then tracked west across the WA interior and eastern Pilbara districts, passing southeast of Marble Bar on 20 January and dropping to its lowest central pressure of 989 hPa on 21 January. The low then rapidly weakened as it recurved to the southeast over the eastern Gascoyne district, after being captured by the mid-latitude westerly flow. The low dissipated over the Goldfields in southern WA on 23 January.

Although the well-developed low came close to the warm coastal waters of the Indian Ocean, the Tropical Cyclone Advises were not issued for the WA coast as there was a high degree of confidence that the low would not move over water and develop into a tropical cyclone. Despite being over land for its life time, the low maintained a remarkably deep monsoonal structure for over a week while traversing the Top End and the interior of WA, until it recurved on 22 January.

C. Warnings

Flood Threat Advises were issued for western and northern parts of the NT from 11 January. Minor Flood Warnings were issued for the Victoria River in the NT. In Western Australia, flood watches and warnings were issued for catchments in the Kimberley, Pilbara, Gascoyne, Interior and Goldfields forecast districts from 14 to 25 January.

Tropical Cyclone Advises were issued from 13 to 15 January, for coastal areas from the Tiwi Islands in the NT to Kalumburu in WA, including Cyclone Warnings on 14 and 15 January west of Daly River Mouth in the NT.

Severe Weather Warnings for Heavy Rainfall and Damaging Winds were issued for the Darwin-Daly (Daly and Tiwi), Arnhem, Roper-McArthur (Carpentaria) and Victoria River

(Gregory) Districts in the NT from 13 to 16 January. Severe Weather Warnings for Heavy Rain were issued for the Gascoyne, Goldfields, Eucla, South Interior, Central Wheat Belt and South East Coastal forecast districts in WA between 21 and 23 January.

Severe Thunderstorm Warnings were issued for the Darwin and rural area on 10 and 11 January and for the Kimberley forecast district on 16 and 17 January. Marine strong wind warnings were issued from 13 January and gale warnings were issued during 14 and 15 January for the Arafura and Timor Seas.

C. Impact

Monsoonal wind squalls in the Darwin suburbs and rural area felled trees onto power lines, causing power outages on 14 January. Darwin's Territory Wildlife Park and the George Brown Darwin Botanic Gardens were closed during the worst conditions on 14 January. Heavy rain caused flash flooding in the Darwin region leading to road closures throughout the rural area. Many regional roads were cut in remote parts of the western Top End, Gregory and Tanami districts in the NT and in the eastern Kimberley region of WA. A 300 metre section of the Katherine-Darwin rail line embankment was washed away, making the track impassable 26 km south of Adelaide River.

Moderate to major flooding occurred at locations in the De Grey River catchment. The Fitzroy River at Fitzroy Crossing peaked around moderate flood level. Minor to moderate flooding was recorded at various locations in the Ord River catchment.

The tropical low, in combination with strong monsoonal winds over the Arafura Sea, caused a significant storm surge in the Gulf of Carpentaria, measured at the Groote Eylandt tidal gauge. While the tropical low was moving across the coast near Darwin on Tuesday 14 January, the tidal residual at Groote Eylandt was 60-70 centimetre above predicted tide levels. Storm tides were estimated to have exceeded the Highest Astronomical Tide level in parts of the southwestern Gulf of Carpentaria during the event.

(Impact information courtesy of the NT News)

D. Observations

Wind

The strongest wind gusts recorded during this event in the NT were 87 km/h at Ngayawili on Elcho Island at 5:24 am ACST (Australian Central Standard Time) 15 January, 80 km/h at Darwin Airport at 9:30 pm ACST on the same day and 65 km/h at Rabbit Flat in the Tanami district at 7 am on 16 January.

In WA, Derby Aerodrome recorded a wind gust of 106 km/h at 16:07 AWST (Australian Western Standard Time) on 17 January.

Newman Aerodrome recorded a wind gust of 94 km/h at 17:23 AWST on 17 January.

The heaviest 24-hour rainfalls recorded during this event were 221.4 mm to 9 am CST on 15 January at Wollgorang near Borroloola (Carpentaria district) and 200 mm at Litchfield Station (Daly district) on 18 January. In the Darwin region, 24-hour rainfall totals of 205.6 mm at Elizabeth Valley and 173.6 mm at Noonamah Airstrip were reported on 15 January.

Rainfall

Rainfall in the Tanami desert was very significant with 8-day totals of 366 mm recorded at The Granites mine, 363.5 mm at Yuendumu and 332.8 mm at Rabbit Flat between 15 January and 23 January. The average annual rainfall at Rabbit Flat is 498.3 mm so the 8-day event total represents 70% of the annual rainfall at that site.

Numerous WA sites in the Kimberley, Pilbara and Gascoyne districts broke their highest daily rainfall record for summer during this event, including 138 mm at Argyle Aero on 16 January, 130 mm at Three Rivers on 22 January, and 127 mm at Eudjina, 121 mm at Cowarna Downs, 109 mm at Leonora on 23 January.

Other significant 24-hour NT and WA rainfall totals were:

14 Jan: 144mm Centre Island (Carpentaria),

15 Jan: 159mm Upper Adelaide River, 153mm Dum-in-Mirrie (Daly), 142mm Borroloola (Carpentaria), 128mm McMinns Lagoon (Daly), 117mm Pirlangimpi (Tiwi);

16 Jan: 142mm Litchfield Station (Daly), 137mm Charnley River (Kimberley); 115mm Upper Victoria River (Gregory), 113mm Kalumburu, 111mm Kununurra Checkpoint (Kimberley);

17 Jan: 142mm Kachana, 115mm Liamma Bore (Kimberley), 108mm Elizabeth Downs (Daly);

18 Jan: 133mm The Granites (Tanami), 124mm Mt Amhurst, 111mm Elgee Cliffs (Kimberley);

19 Jan: 124mm Howard Springs National Park, 123mm Stokes Hill, 115mm Port Keats Aero (Daly), 110mm Drysdale Station (Kimberley);

20 Jan: 147mm Ripon Hills Rd (Pilbara);

21 Jan: 168mm Barimunya, 128mm Marillana, 108mm Marble Bar (Pilbara);

22 Jan: 183mm Mingah Springs, 151mm Doolgunna (Gascoyne), 135mm West Roebuck (Kimberley).

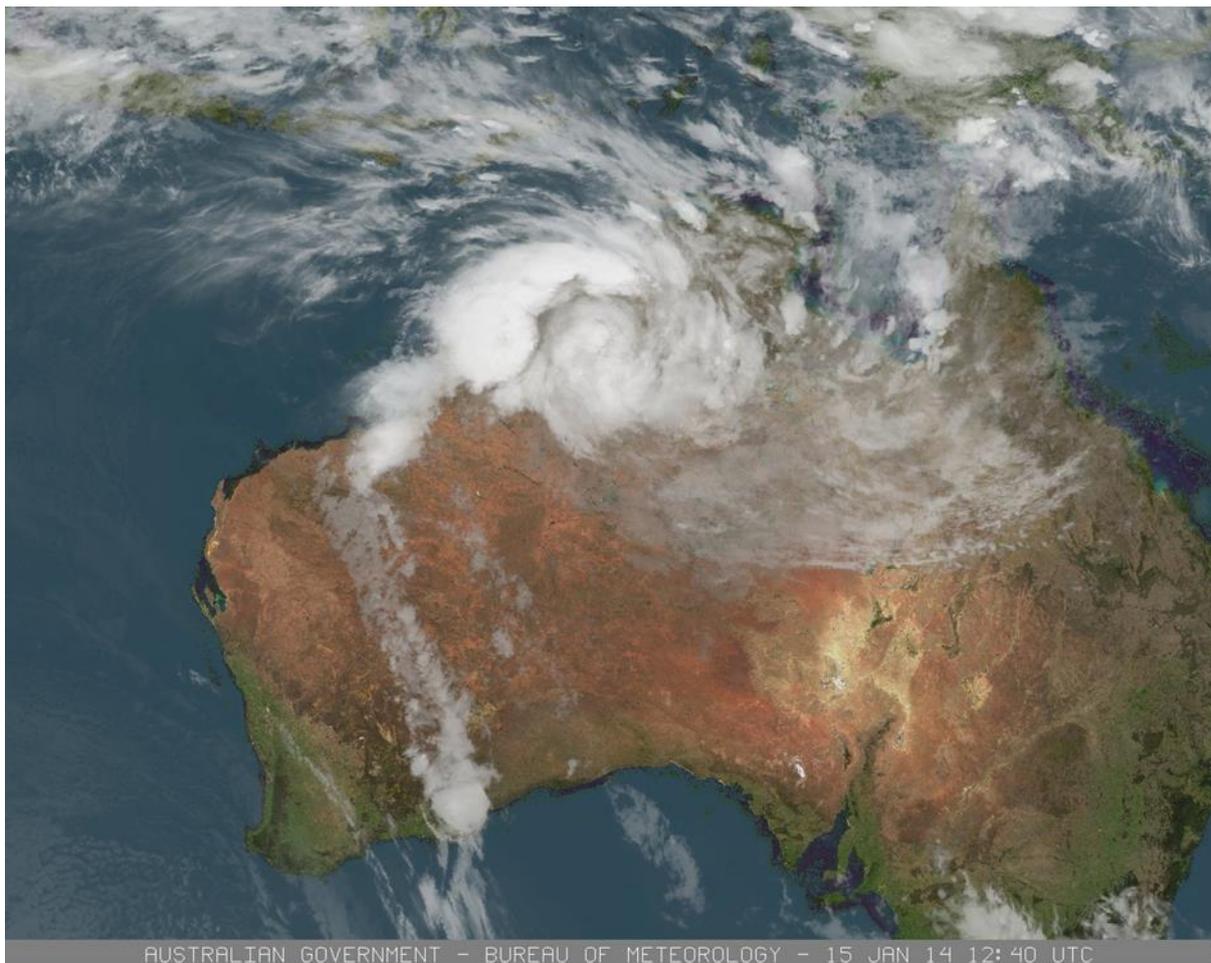


Figure 2. Infrared satellite image of the tropical low at 1240 UTC (10:50 pm ACST) 15 January 2014 (Satellite image originally processed by the Bureau of Meteorology from the geostationary meteorological satellite MTSAT-1R operated by the Japan Meteorological Agency).

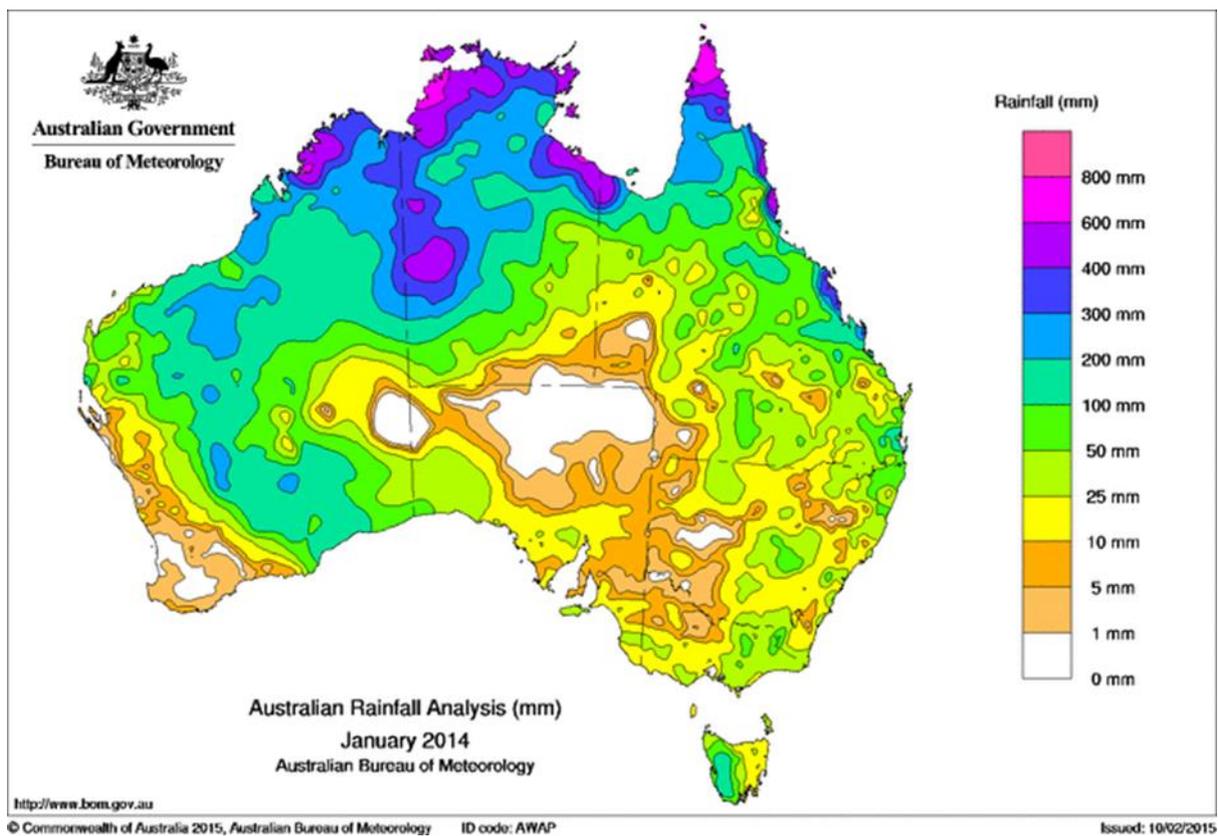


Figure 3. Rainfall totals for January 2014.