

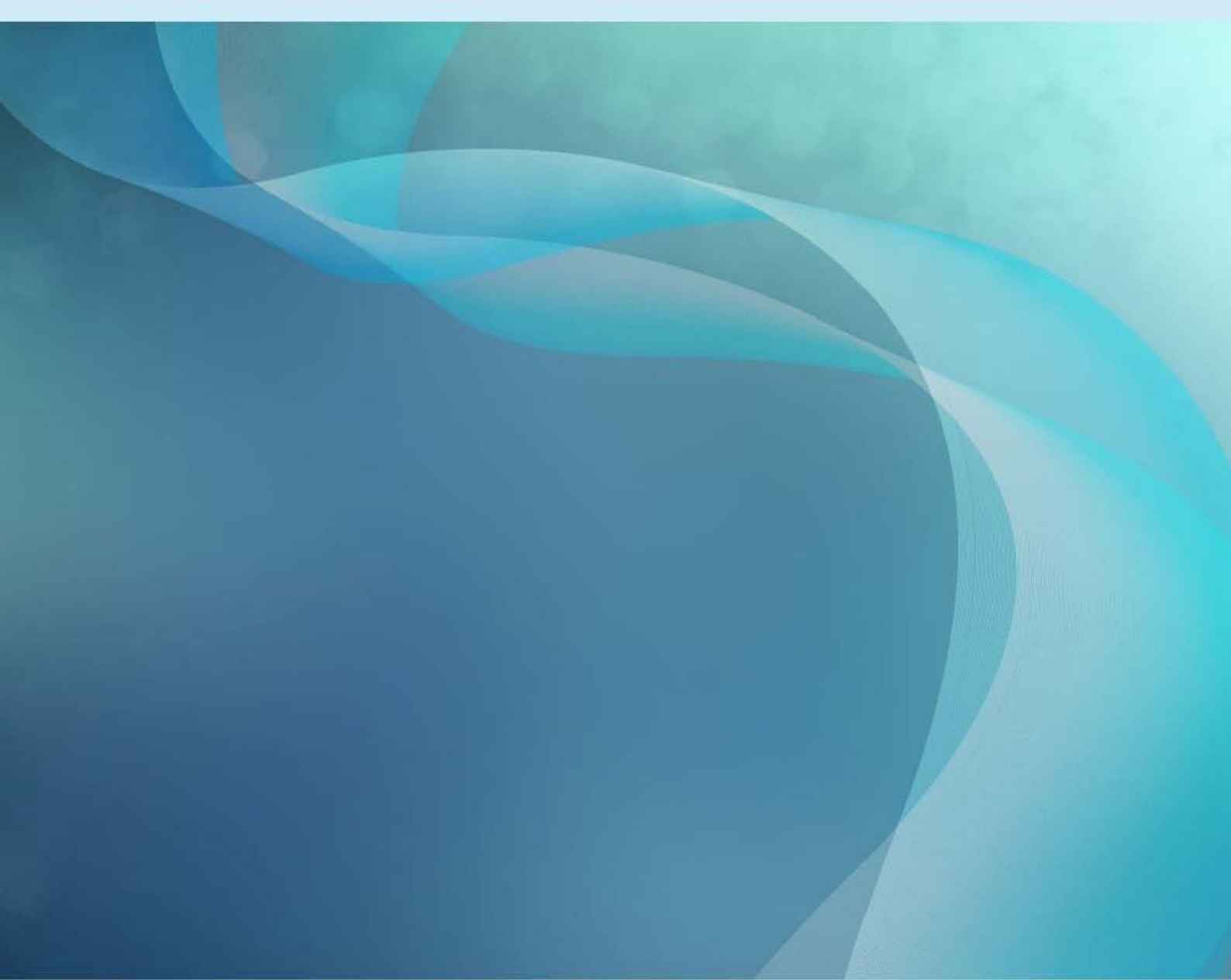


Australian Government
Bureau of Meteorology

Severe Tropical Cyclone *Olivia*

3 – 12 April 1996

Updated February 2021



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1 Summary

Severe Tropical cyclone Olivia, the last to affect the Western Australian coast in the 1995/96 season, crossed the north west Australian coast as an extremely intense category 4 tropical cyclone.

Olivia reached peak intensity late on 9 April and remained near peak intensity as it crossed the west Pilbara coast late on 10 April. Olivia accelerated to the southeast and weakened to a low during 11 April when it was north of Laverton.

The offshore oil industry around Barrow Island suffered millions of dollars damage as Olivia passed. Mardie and other surrounding cattle stations suffered extensive damage to their properties. Pannawonica was also extensively damaged.

Barrow Island recorded a wind gust of 408 km/h as Olivia passed over. Although this gust was initially regarded as suspect, the gust was later verified as reliable and stands as the world record for the highest wind gust in a tropical cyclone:

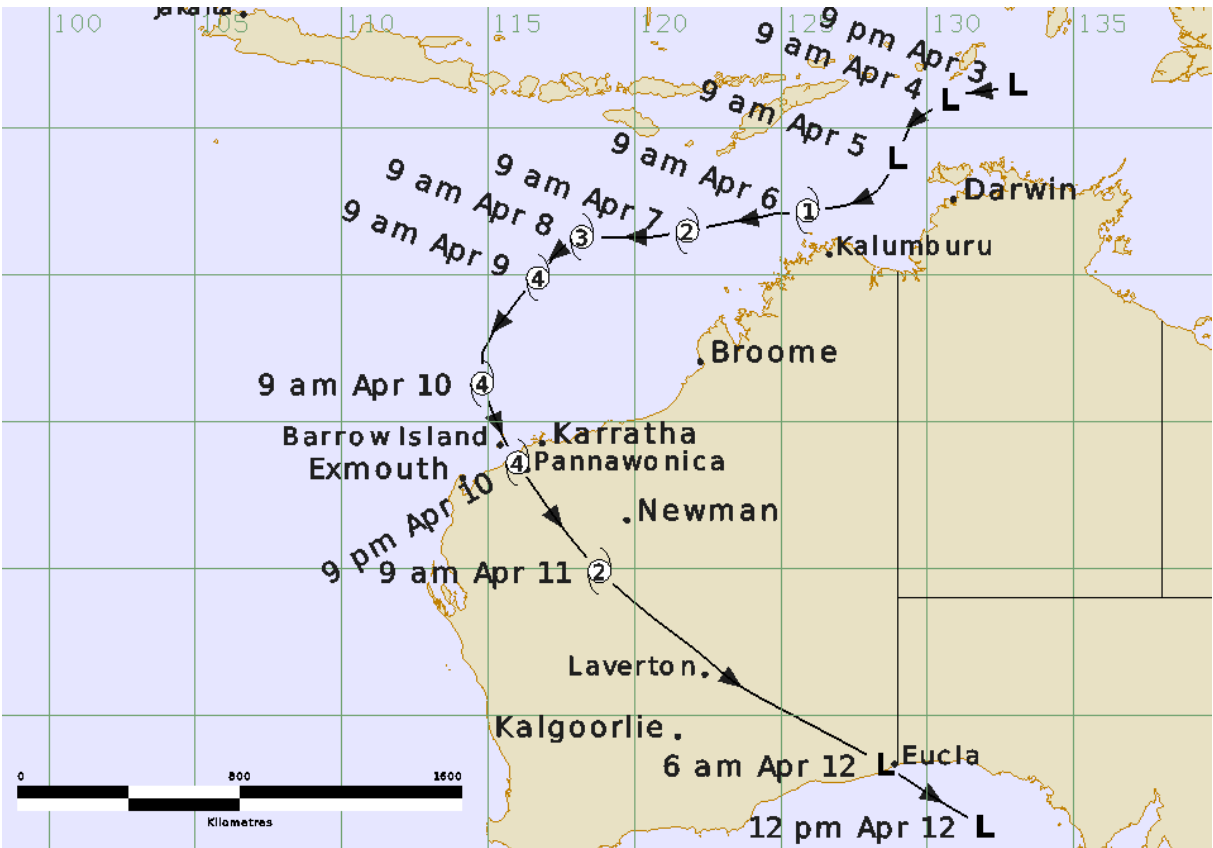
World Meteorological Organisation record: <https://wmo.asu.edu/content/world-maximum-surface-wind-gust-TC>

and http://www.bom.gov.au/jshess/docs/2012/courtney_hres.pdf Journal documentation:

Extreme gusts were also recorded at Varanus Island: 267 km/h and Mardie Station 257 km/h.

Despite these extreme wind gust measurements, Olivia was assessed as a category 4 cyclone which is based the mean wind estimate of 195 km/h influenced by the Dvorak technique estimate of CI=6.0. The extreme Barrow Island wind gusts are not considered representative of the intensity of the tropical cyclone.

Figure 1. Best track of Severe Tropical Cyclone *Olivia* 3 - 12 April 1996 (times in AWST, UTC+8).



2 Meteorological Description

2.1 Intensity analysis

A low to mid-level circulation was evident over the Indonesian archipelago north of Darwin from 2 April. This circulation slowly developed and drifted south. Development was assisted by a weak low-level surge across the equator north of the low. Development continued on 4 April but was slow due to increased high-level northeasterly winds across the circulation and weak cross-equatorial flow continued into the circulation. Olivia reached category one intensity on 5 April as it turned towards the west taking it to the north of Troughton Island.

This change in direction occurred as a middle-level ridge to the south strengthened. Persistent high-level northeasterly winds continued to shear convection away from the circulation and retarded the speed of development up to 7 April. However, the passage of an upper trough to the south on 8 April weakened these upper winds and their shearing influence and the cyclone then proceeded to develop more rapidly reaching severe (category three) intensity. This trough system also weakened the middle-level ridge south of Olivia and it turned towards the southwest.

It reached severe cyclone intensity (Category 3) early on the morning of 8 April. During 8 April Olivia slowed and began to track southwest, intensifying to a Category 4 cyclone by the morning of 9 April with an eye appearing on satellite imagery. Later on 9 April Olivia moved on a southerly track and reach peak intensity of about 925 hPa.

Another trough system approaching from the west later on 9 April 1996 continued to erode the middle-level ridge. This steered Olivia southwards on 10 April 1996 and then rapidly towards the south-southeast and the Western Australian northwest coast as the deep north- westerly flow increased ahead of the trough system.

Olivia remained at near peak intensity until it crossed the coast near Mardie about 1230 UTC 10 April. Olivia continued to track to the southeast and weakened to a low later on 11 April when it was north of Laverton, though it continued to produce gale-force winds on the north east flank even as far south as Forrest, near the Great Australian Bight. It passed into the Great Australian Bight near Eucla on the morning of 12 April and then was absorbed into a southern trough system.

2.2 Structure and motion

The tropical low initially moved slowly south. It turned west on 5 April as a middle level ridge to the south strengthened. Westward movement was maintained until 8 April when the ridge southeast of Olivia weakened and moved north as a trough amplified over southeast Australia. This caused the cyclone to move southwest. The cyclone was captured by a middle level trough approaching from the west later on 9 April. By 10 April Olivia was moving south and then south southeast and was accelerating towards the northwest coast of Western Australia under the influence of an increasing environmental northwest flow. Acceleration to the southeast continued as the cyclone moved southeast across Western Australia. The low level centre crossed into the Great Australian Bight on 12 April.

3 Impact

The offshore oil industry around Barrow Island suffered millions of dollars damage as Olivia passed. Mardie and other surrounding cattle stations suffered extensive damage to their properties. Pannawonica, which is situated 90 kilometres inland from Mardie and recorded gusts to 85 knots (157 km/h), was extensively damaged. King Bay, some 120 km along the coast from the point of landfall, reported a two-metre storm surge. A maximum wave height of 21.0 metres was recorded at the North Rankin A gas platform. Even as Olivia passed Paraburdoo after midnight, it still produced gusts to 75 knots (139 km/h).

4 Observations

4.1 Wind

Maximum wind gusts: 408 km/h at Barrow Island; 269 km/h at Varanus Island; 259 km/h at Mardie. More details in:

http://www.bom.gov.au/jshess/docs/2012/courtney_hres.pdf

4.2 Pressure

Minimum pressure reported: Varanus Island 927 hPa at 1200Z 10 April.

4.3 Storm tide

King Bay, some 120 km along the coast from the point of landfall, reported a two-metre storm surge.

Table 1. Best track summary for Severe Tropical Cyclone *Olivia*

Refer to the Australian Tropical Cyclone database for complete listing of parameters. WST is UTC + 8 hours.

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Max Wind 10 min kn	Cent. Press. hPa
1996	04	04	01	9.0	130.7	25	1002
1996	04	04	07	9.4	130.1	25	1000
1996	04	04	13	9.8	129.5	25	1000
1996	04	04	19	10.4	129.2	25	1000
1996	04	05	01	11.0	128.9	30	996
1996	04	05	07	12.1	128.3	30	996
1996	04	05	13	12.5	127.6	30	996
1996	04	05	19	12.7	126.8	30	996

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Max Wind 10 min kn	Cent. Press. hPa
1996	04	06	01	12.8	125.9	40	990
1996	04	06	07	12.9	124.9	50	985
1996	04	06	13	13.1	123.9	50	985
1996	04	06	19	13.3	122.8	50	985
1996	04	07	01	13.5	121.8	50	985
1996	04	07	07	13.7	120.6	55	980
1996	04	07	13	13.7	119.8	60	975
1996	04	07	19	13.7	119.0	65	970
1996	04	08	01	13.7	118.2	70	965
1996	04	08	07	13.9	117.8	70	965
1996	04	08	13	14.2	117.4	75	960
1996	04	08	19	14.6	117.1	80	955
1996	04	09	01	15.1	116.7	90	945
1996	04	09	07	16.0	115.9	95	935
1996	04	09	13	16.9	115.2	105	925
1996	04	09	19	17.7	114.8	105	925
1996	04	10	01	18.7	114.8	105	925
1996	04	10	07	19.8	115.2	105	925
1996	04	10	13	21.4	116.0	105	930

Year	Month	Day	Hour UTC	Pos. Lat S	Pos. Long. E	Max Wind 10 min kn	Cent. Press. hPa
1996	04	10	19	23.3	117.3	65	970
1996	04	11	01	25.1	118.8	55	980
1996	04	11	07	26.9	120.9	45	985
1996	04	11	13	28.8	123.3	40	990
1996	04	11	19	30.7	126.7	35	995
1996	04	12	01	32.8	130.2	30	995

Figure 2. Visible image of Severe Tropical Cyclone Olivia, 10 April 1996.

