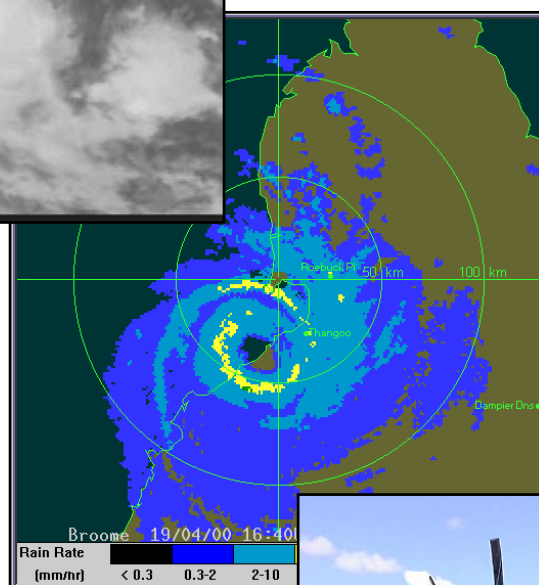
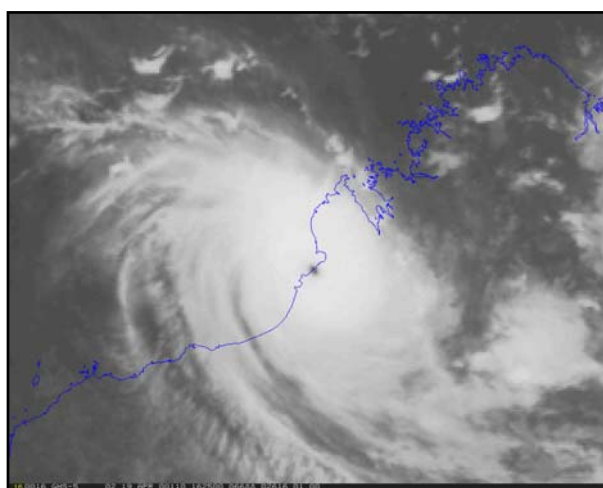


1999 – 2000

Tropical Cyclone Season

Summary

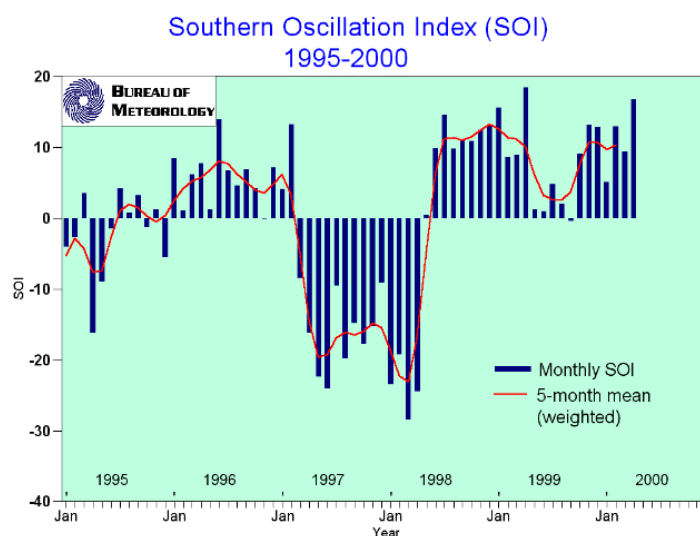


Bureau of Meteorology

SEASON SUMMARY

Season Overview

The winter months of 1999 were characterised by values of the Southern Oscillation Index (SOI) close to zero. In October there was an abrupt increase in the SOI and moderate positive values of the index persisted throughout the tropical cyclone season. The return to positive values signalled the onset of a new *La Nina* event and this transition had a strong influence on both the number of tropical cyclones off northwest Australia (east of 110°E) and wet season rainfall over the north of the state. In total 8 tropical cyclones formed in waters off the northwest coast compared to the long term average of 4. Of the 8, 4 produced at least gale force winds in coastal areas and 4 reached severe intensity.

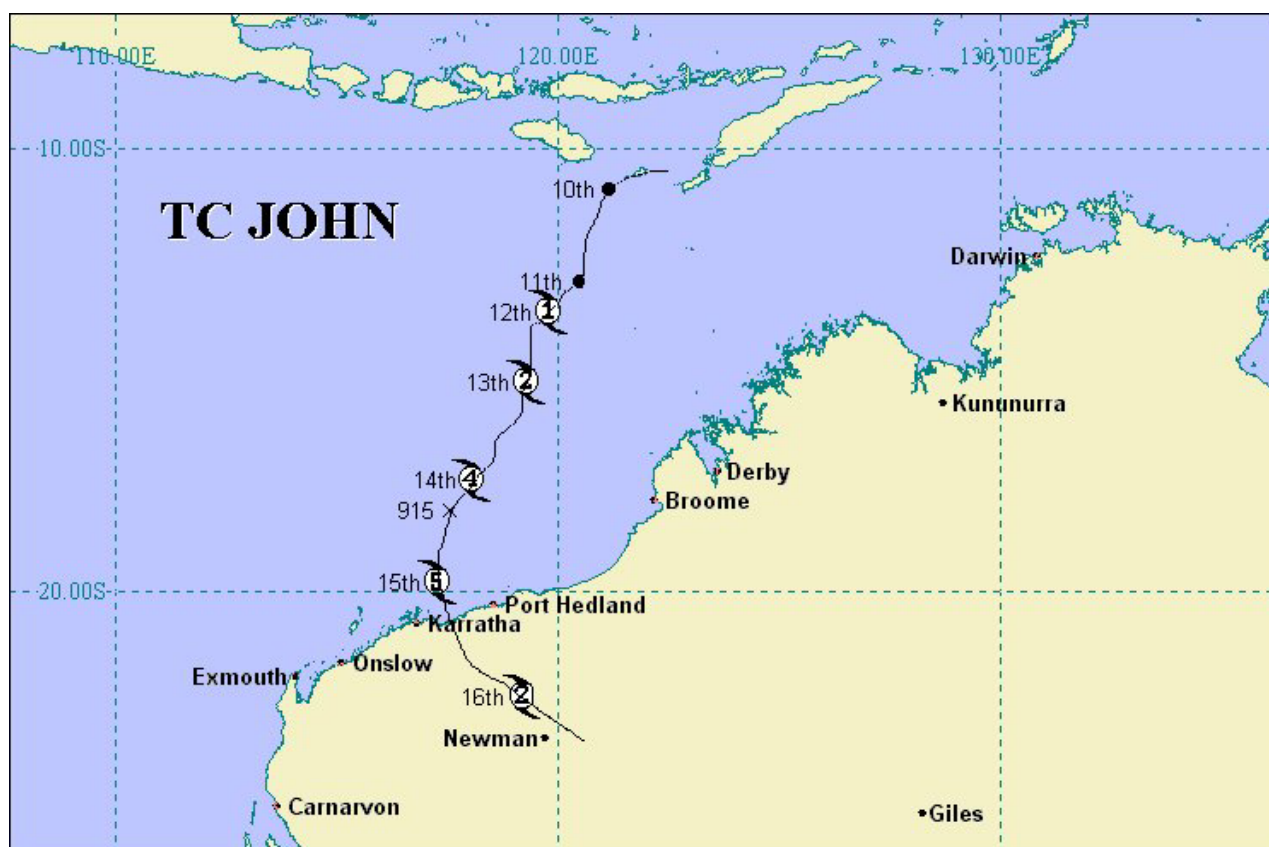


Tropical cyclone *Ilsa* 09 December 1999 – 17 December 1999

TC *Ilsa*, the first in the Western Region for the 1999-2000 season, formed to the northeast of the Cocos Islands on the 11 December 1999. It's development was impeded by vertical windshear for a large part of its lifetime. After a long track eastwards across the Indian Ocean it eventually crossed the WA coastline on the Eighty Mile Beach during the early afternoon of 17 December 1999.

Severe Tropical Cyclone *John* 09 December 1999 – 16 December 1999

The formation of TC *John* was associated with the first cross equatorial northwest surge into the monsoon trough. Following formation the cyclone intensified rapidly and moved on a south southwest track towards the Pilbara coast. It was at its peak intensity (category 5, 915 hPa) in the period just prior to land fall between Port Hedland and Karratha (just to the west of Whim Creek) on 0830 WST 15 December 1999. At the time of coastal crossing it was estimated to have a central pressure between 930 and 940 hPa. Port Hedland experienced gale force winds for a period of 18 hours and near storm force winds with gusts to 124 km/h were observed for much of the 15 December 1999. A maximum storm surge of 2m was recorded by the Port Hedland Authority at 0600 WST 15 December 1999. At Karratha, on the western side of the circulation, the maximum wind gust recorded was 113 km/h and at Cape Lambert winds averaged 150km/h for 5 hours with a maximum gust of 210 km/h (Robe River Iron Ore AWS data).



Tropical Low 21 – 23 January 2000

A tropical low formed in the Timor Sea on 19 January and moved southwest. From 21 January the low began a south easterly movement towards the Pilbara coast. Even though the monsoon low deepened to a central pressure of near 992 hPa as it approached the Pilbara coast, it didn't develop into a tropical cyclone.

Tropical Cyclone *Kirrily* 24 January - 1 February 2000

Tropical cyclone *Kirrily* formed about 350 kilometres east of the Cocos Islands and moved west southwest towards the West Australian coast. *Kirrily* intensified, reaching Category 2 status on 27 January. On 28 January *Kirrily* turned southwest, moving away from the coast, weakening to below cyclone strength by 31 January.

Severe Tropical Cyclone *Norman* 29 February - 8 March 2000

Tropical cyclone *Norman* developed from a low that moved off the west Kimberley coast. The cyclone tracked parallel to the Pilbara coastline for 3 days at a distance of about 250 kilometres, before continuing on a westward track away from the West Australian coast. *Norman* quickly reached a category 5 cyclone on 2 March but weakened over the following 2 days. The system finally sheared during the 8-9 February with the low level centre moving in a northwest direction before dissipating.

Tropical Cyclone *Steve* 05 March– 09 March 2000

TC *Steve* was first identified as a tropical low to the east of Willis Island on 25 February 2000. The cyclone crossed the Queensland coast as a Category 2 system on 27 February to the north of Cairns. *Steve* weakened slowly over land and was downgraded to a tropical low on 28 February. The low continued to track westward and on 28 February re-intensified to tropical cyclone strength over the

Gulf of Carpentaria, re-crossing the coast north of Port McArthur on 1 March as a category 1. Ex-Steve low maintained a strong low to middle level circulation as it crossed the base of the Top End of the Northern Territory. The low moved just south of the Joseph Boneparte Gulf into the Kimberley region of West Australia and reformed once again into a tropical cyclone just west of Broome on 5 March. TC *Steve* moved in a west southwest direction parallel to the Pilbara coast and deepened to 975 hPa during 6 March. Near gale force winds were experienced at Port Hedland for a period of about 17 hours commencing at midnight (WST) on 5 March. The peak hourly average wind speed was 72 km/h and the maximum gust recorded was 104 km/h (between 0800 and 0900 (WST) 6 March). Winds averaged near 70 km/h at Karratha in the early evening 6 March and the maximum gust recorded was 98 km/h at 1000 UTC. It crossed the Pilbara coast near Mardie around midnight on 6 March 2000. TC *Steve* then moved southwest overland across the west Pilbara before moving out to sea north of Carnarvon in the early hours of 08 March 2000. It moved southwest out to sea from Carnarvon during 8 March as a Category 1 cyclone before slowly recurving to the southeast during the 9 March. It crossed the west coast to the east of Denham about midnight 9 March then increased in speed as it moved southeast across the Murchison and Goldfields and became extra-tropical. It reached the south coast, east of Esperance, late on 11 March and then continued a southeast track across the Bight.

The very heavy rainfall associated with *Steve* produced widespread flooding in northern parts of the state, including the Gascoyne region. Flood Advises were issued for a large area and included the catchments of the Fitzroy, De Grey, Gascoyne and Murchison Rivers. Much of the Kimberley, Pilbara and Gascoyne reported cumulative rainfall totals in excess of 100 mm. Higher falls, greater than 300 mm, were recorded near the 80 Mile Beach. Parts of the western Pilbara and northern Gascoyne received totals that ranged from 200 to 300 mm. Several sites reported highest on record daily rainfall amounts including Mandora (281.0 mm on 6 March) and Mount Narryer (152.0 mm on 10 March). Carnarvon (100.6 mm on 9 March) reported it's highest March daily rainfall since records commenced 45 years ago. Rainfall ranging from 50 to 100 mm continued over inland parts extending in a south-easterly direction from the West Gascoyne to the South Coast near Esperance. Flooding occurred in the Esperance area and number of roads and bridges were washed away. Salmon Gums Research Station recorded 91 mm of rain on the 11 March and Esperance Met. Office recorded 54.2 mm.



Tropical Cyclone *Olga* 15 – 19 March 2000

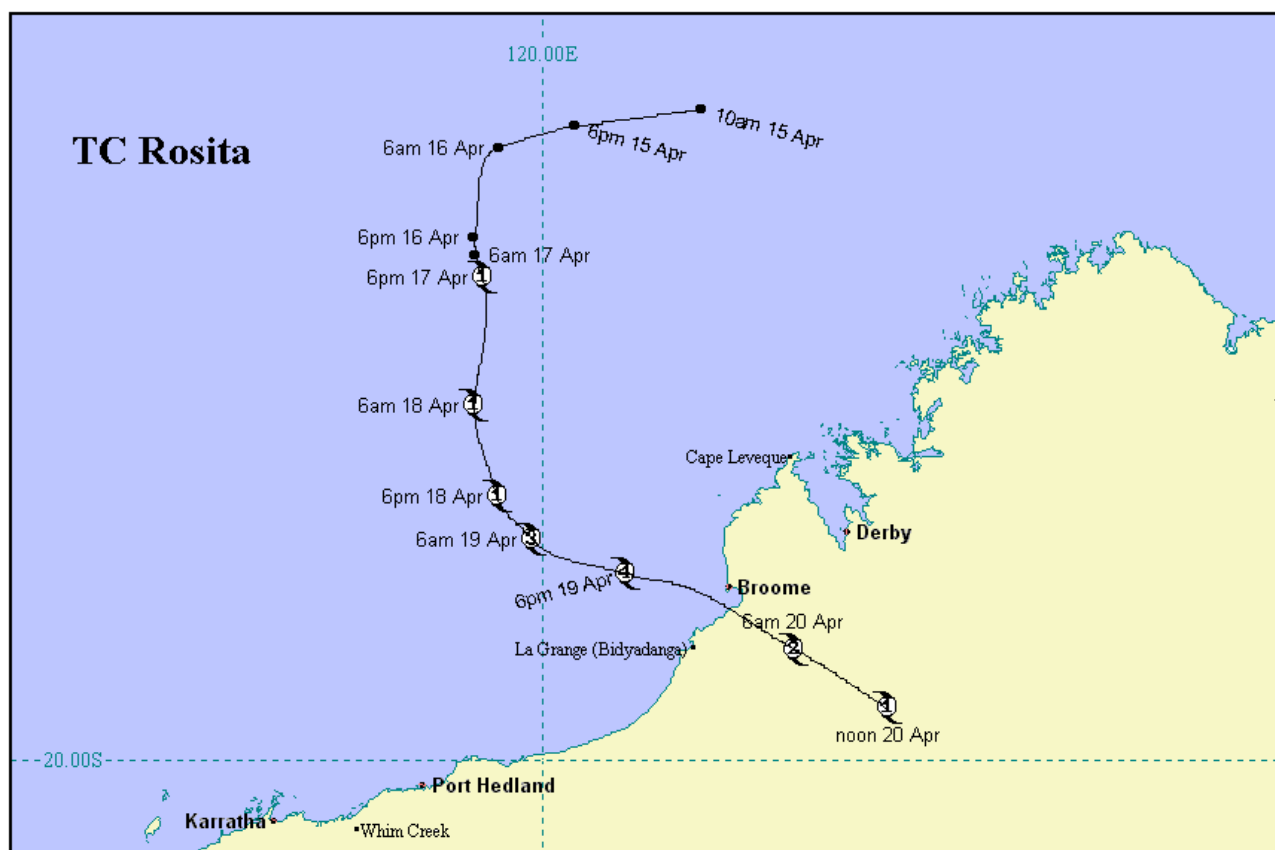
TC *Olga* formed from a low that developed in the Timor Sea. The cyclone maintained a west southwest track, parallelling the Kimberley and Pilbara coasts. *Olga* intensified to category 2 status before weakening well to the west southwest of Exmouth.

Severe Tropical Cyclone *Paul* 13 – 20 April 2000

TC *Paul* formed about 1000 kilometres north of Karratha on 13 April and moved west, away from the West Australian coastline, thus never posing any threat to coastal communities. *Paul* intensified steadily, reaching category 5 status on 15 April. During 18 April *Paul*'s westward movement slowed and the cyclone weakened. The cyclone slowed to be almost stationary on 20 April and weakened to below cyclone strength.

Severe Tropical Cyclone *Rosita* 17 – 21 April 2000

TC *Rosita* was one of the most severe tropical cyclones to cross the west Kimberley coast in the last 100 years. It crossed the coast as a category 5 cyclone 40 kilometres south of Broome at 0100 WST 20 April. *Rosita* was a small but very powerful cyclone. It's region of very destructive winds passed south of Broome by only 15 kilometres or so. Severe structural damage occurred at the Eco Beach tourist resort and at nearby Thangoo Station where the eye crossed the coast. In Broome the maximum wind gust was 153 kilometres per hour. Although there was extensive damage to trees in the town most buildings remained unscathed. Power supplies were cut to many parts of the town for a period of several days. After crossing the coast it moved southeast across the north of the Great Sandy desert passing across the community of Balgo Hills around 2200 WST 20 April approximately 700 kilometres inland. It was estimated to be still a category 1 cyclone and caused some damage to trees and property. For more details on the impact of *Rosita* see report.



Forecast Performance Summary

Forecast accuracy 99/00 season

TC	0 hr	+12 hr	+24 hr
<i>John</i>	18 km	56 km	100 km
<i>Ilsa</i>	39 km	72 km	120 km
<i>Steve</i>	23 km	74 km	121 km
<i>Rosita</i>	28 km	110 km	214 km
Average	28 km	74 km	130 km
Long Term Average	43 km	105 km	189 km

Forecast lead time to gales on the coast 99/00 Season

TC	Town	Lead Time
<i>John</i>	Karratha	37 hours
<i>Steve</i>	Port Hedland	20 hours
<i>Rosita</i>	Broome	15 hours