

or even some kilometres inland. Most structural damage is caused by the wind-driven waves which usually expend their energy on the foreshore dunes or the first row or two of houses. Damage from a storm tide is thus usually confined to a narrow zone 100 metres deep or less along the foreshore. Unfortunately fatalities may not be so confined; drownings can occur throughout an area inundated by the sea.

When a severe tropical cyclone is approaching a vulnerable area the warnings must explicitly indicate the danger to ensure that endangered communities are fully alerted, and convince people that they are threatened by an event which has not occurred in living memory or even in recorded history.

Detection

Many more tropical cyclones have been recorded in each of the last twenty-five years than in previous years. There is no evidence that more cyclones are occurring — we simply detect them nowadays. Weather satellites enable all areas of disturbed weather to be monitored for possible development. An area favourable for tropical cyclone development will first

appear on a satellite photograph as a cluster of active thunderstorms. These must cover an area of about 500 kilometres in diameter and persist for two to three days for a tropical depression to form and begin to deepen. As a tropical cyclone gathers momentum the thunderstorms become organized into easily recognisable spiralling bands. In a mature tropical cyclone the outer bands spiral in to a tightly-banded circular cloud mass. A relatively cloud-free central eye often occurs but may be obscured by high cloud.

Satellite photographs enable a tropical cyclone to be located on average to within about 100 kilometres; intense tropical cyclones with well-developed eyes can be located much more accurately — perhaps to within 30 to 50 kilometres. However, such photographs can give very misleading impressions of the locations of weak or tilted systems, or of quite severe tropical cyclones which have had their upper level cloud structure sheared away by strong winds. It is possible for sheared systems to be hundreds of kilometres from their apparent positions on satellite photographs.

Once a tropical cyclone moves to

within about 250 kilometres of a coast, surveillance radars enables its position to be fixed much more accurately — usually to within about 10 kilometres. In some moderate circulations with disorganized thunderstorm activity it can be difficult to locate the centre of the system. However all severe tropical cyclones capable of significant destruction are readily evident on radar.

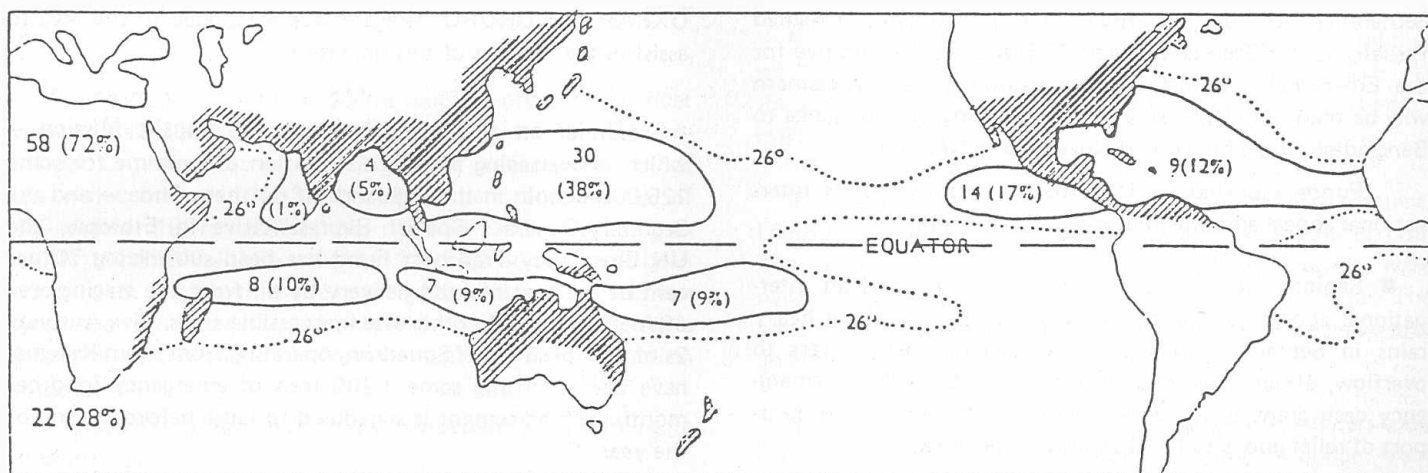
Aircraft and ships also provide reports which help to locate tropical cyclones. However, they try to keep away from well-developed cyclones so usually only provide peripheral information.

The Tropical Cyclone Warning System in Australia

The Bureau of Meteorology operates Tropical Cyclone Warning Centres in Perth, Darwin and Brisbane. These warnings range from a Watch Phase, issued 48 hours before gale force winds are expected to hit the coast; a Warning Phase, when gales are expected within 24 hours; and Flashes if any significant change is forecast.

As soon as a tropical cyclone comes under radar surveillance its

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Formation of tropical cyclones — average annual number plus percentage of total.

/// indicates land areas affected by tropical cyclones.