Tropical Cyclones:

The Warning System in Australia

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Introduction

Who will be visiting your town next summer? If it is Charlie, Delilah or Ernie, they will not be very welcome. But they will not arrive unannounced. They will be mentioned by the media for a few days beforehand. They will be watched closely as they draw nearer. Finally the announcements will become very frequent and very urgent. The community will be alive with last minute preparations. The unwelcome visitor will become the major topic of conversation and everyone will be keeping close to a radio to hear every warning. You will be under threat from a tropical cyclone.

In north America or the central south Pacific it would be called a hurricane. In the northwest Pacific it would be called a typhoon. In the Bay of Bengal, the Arabian Sea, the southwest Indian Ocean or around Australia it is known as a tropical cyclone. They are all just alternative names for the same severe weather event — the greatest weather hazard known to man.*

Development

Around the globe about eighty tropical cyclones occur each year; several specific conditions are necessary, and must occur simultaneously, for their development:

- deep convection over a large area
- sea temperature above 26 degrees Celsius
- turning force due to the Earth's rotation
- light winds up to about ten kilometres
- divergent winds aloft to provide ventilation
- rotation and inflow of winds at low altitude
- high relative humidity up to about six kilometres.

Tropical cyclones do not cross the equator or form within four or five latitude degrees of it, where the influence of the Earth's rotation is negligible. This influence becomes greater with increasing latitude and acts in opposite directions in each hemisphere, causing tropical cyclones to rotate clockwise in the southern hemisphere and anticlockwise in the northern one.

Tropical cyclones derive their energy from warm moisture picked up from the sea. To provide and maintain such energy, the sea surface temperature needs to be at least 26 degrees Celsius. Tropical cyclones weaken over cooler water and more rapidly when moving over land. Low-level winds must converge into an area of disturbed weather to provide some initial rotation. Then a developing tropical depression needs a continuing spiral inflow to supply momentum and water vapour to the spinning vortex.

Tropical cyclones do not occur in the eastern South Pacific Ocean, where the sea temperature is always too low. Nor do they form in the South Atlantic Ocean because of similar low temperatures and unfavourable upper winds.

For a low pressure system to deepen, upper winds up to a height of 10 km need to be light, i.e. less than 35 km per hour, so that the column of warm air does not become tilted or dispersed. The surface pressure falls when the column of air above a particular location becomes warmer and therefore lighter than the surrounding air. In a developing tropical cyclone the warming effect results from the latent heat released by condensation to produce rainfall in thunderstorms. Dried air needs to be blown away from the top of the system to prevent it from sinking

**Throughout the text the author refers to all these weather events, wherever they occur, as tropical cyclones.*