

## **Tropical Cyclones: Hazard Modelling and Risk Assessment**

### **Tropical Cyclones in Australia**

A tropical cyclone (or hurricane in North America, typhoon in Asia) is an intense tropical low-pressure weather system where, in the southern hemisphere, winds circulate clockwise around the centre (Figure 1). Tropical cyclone development is complex, but researchers have identified three components of a tropical cyclone that make up the total cyclone hazard – strong winds, intense rainfall and induced ocean effects including extreme waves, currents, storm surge and resulting storm tide.

The Bureau of Meteorology uses the five-category system shown in the table for classifying tropical cyclone intensity in Australia.

<b>Category</b>	<b>Maximum Wind Gust (km/h)</b>	<b>Potential Damage</b>
1	<125	minor
2	125-170	moderate
3	170-225	major
4	225-280	devastating
5	>280	extreme

### **Australian communities are affected by tropical cyclones**

In Australia, over the period 1967 to 1999 the total cost of tropical cyclones accounts for about \$8.8 billion, averaging \$266 million per year. From 1967 to 1999, 46 cyclones causing more than \$10 million damages have been recorded in Australia, with an average of 1.4 cyclone per annum. In two states and one territory (Queensland, Western Australia and Northern Territory), tropical cyclones are ranked in one of top two most hazard types. Australia's cyclone season is usually November to April.

- ***Cyclone Mahina*** (March 1899, over Queensland) caused over 400 deaths including the crews of 100 vessels and an estimated 100 local aborigines.
- ***Cyclone Tracy*** (Dec 1974, over Northern Territory) struck Darwin on Christmas Eve with estimated winds of up to 250 km/h and killed 65 people (including 16 at sea). Approximately 650 people were treated for injuries and more than 35,000 people were evacuated. Over 80% of all buildings in Darwin were destroyed with insured losses of \$837 million and a total estimated costs of \$4,180 million.

### **Geoscience Australia is committed to cyclone modelling and risk assessment**

Geoscience Australia is currently working in collaboration with the Bureau of Meteorology to develop a tropical cyclone hazard risk assessment for the Australian region. Research will focus on windfield modelling and community vulnerability including housing, demographics, infrastructure in relation to the tropical cyclone hazard. The output of this research will provide a comprehensive risk assessment including possible casualties and economic losses due to possible cyclone events affecting a particular building or a region.

The cyclone risk assessment will help town planners and emergency managers make informed decisions so that safer, more sustainable and more prosperous communities can be developed via the implementation of appropriate planning, mitigation and prevention measures.

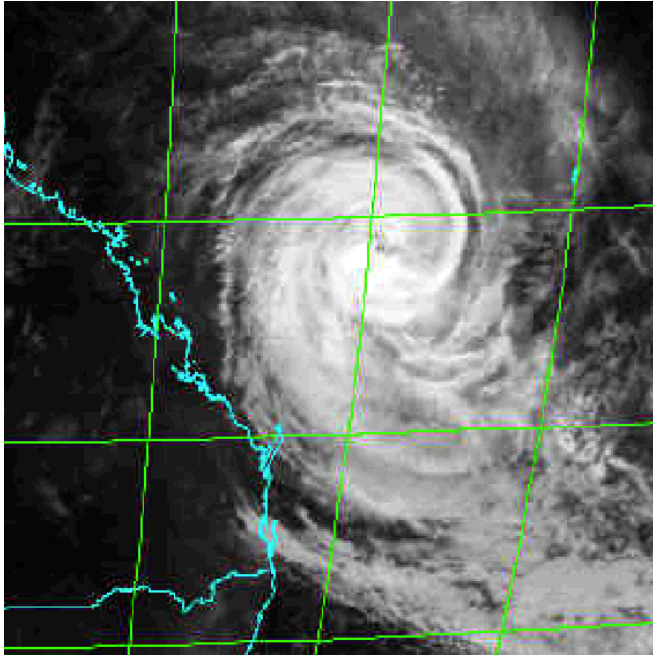


Figure 1: Tropical cyclone Fran approaching the Queensland coast in March 1992.