

# AVIATION WEATHER HAZARDS

## Christmas Island Airport (YPXM)

Bureau of Meteorology › Aviation Weather Services



Latitude: S10 27 02

Longitude: E105 41 25

Height above mean sea level: 916 ft (279 m)



Christmas Island, Indian Ocean

This pamphlet describes hazardous weather conditions for Christmas Island Airport. It is one of a series of pamphlets focussing on hazardous weather conditions at a number of the busier general aviation aerodromes. Pilots should regard this publication as information provided in support of official forecasts.

### Introduction

Christmas Island is located in the Indian Ocean, approximately 2600 km northwest of Perth, 980 km east-northeast of the Cocos (Keeling) Islands and 490 km south-southwest of the Indonesian capital of Jakarta.

Christmas Island is bounded by near-vertical 10–20 m cliffs that then rise steeply to a plateau several hundred metres above sea level on which the aerodrome is located. The aerodrome is situated on the northeast corner of Christmas Island and sits at an elevation of 916 ft (279 m) above sea level



Christmas Island

### Climatology

Situated in the tropics south of the equator, Christmas Island experiences two seasons: a drier period, from June to November, when the region is dominated by the east to southeast trade flow; and a wet season from November to May, when the monsoon trough moves south of the equator. Most years there is a gradual shift between the seasons, meaning the transition months of May, June and November can exhibit significant rainfall variability. Tropical cyclones and monsoon lows can affect the island anytime between November and May.

On average, Christmas Island receives over 2100 mm of rainfall per year over approximately 170 rain days. Historically, August is the driest month (averaging around 43 mm of rain) and February is the wettest month (averaging around 349 mm), but significant rainfall can occur at any time of year.

An automatic weather station (AWS) with ceilometer and visibility meter is located at the airport.



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## Wind

The wind at Christmas Island is dominated by an east to southeast trade flow for much of the year, with some increased variability seen in the wet season.

During the dry season, when the trade flow is strongest, winds are generally from the east to south-east at around 10–15 knots. In summer, as the monsoon trough moves south and the trade flow eases over the island and winds generally become lighter, often less than 10 knots, without a dominant direction. From March to May the winds begin to increase and be dominated by east to south-easterly flow as the trade flow re-establishes.

Several times each wet season, strong west to north-westerly monsoon bursts develop that can last up to a week. Occasionally during the wet season, the island can be influenced by a monsoon low or tropical cyclone, in which case the speed and direction of the winds will depend on the proximity and position of the system relative to the island.

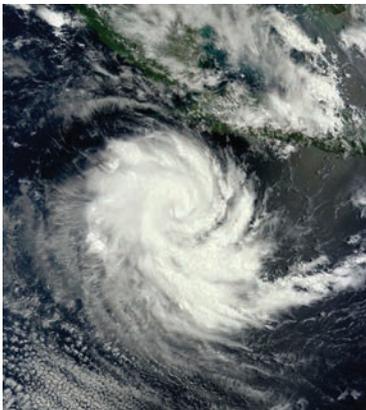
## Tropical cyclones and the monsoon trough

Between November and April each year, tropical cyclones are a potential hazard for the region. During this time of year, the monsoon trough generally lies just to the north of the island, often bringing adverse weather conditions to the region. The effect a tropical cyclone may have on Christmas Island depends on its size, severity and position relative to the island.

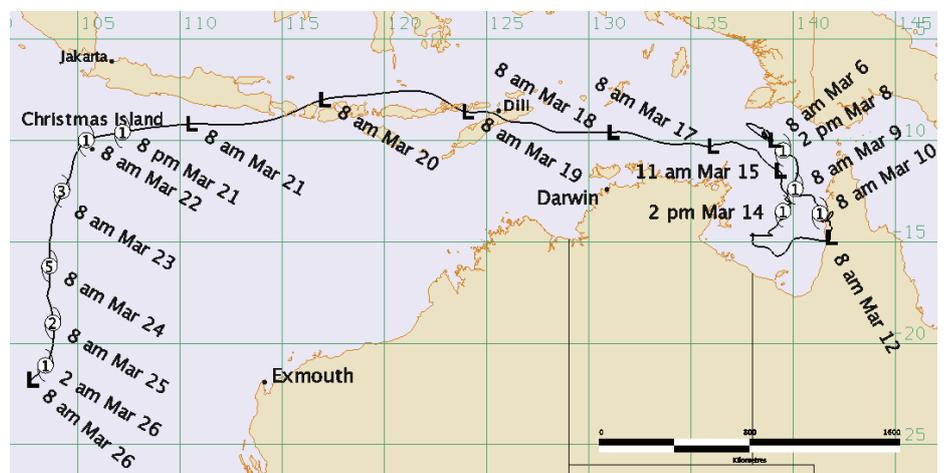
Monsoon lows and tropical cyclones often develop in the monsoon trough. These systems occasionally affect Christmas Island, bringing strong winds, heavy rainfall and thunderstorms to the area. Low cloud, reduced visibility and heavy rainfall can be expected. In addition, severe turbulence and icing are likely hazards to aviation during these events. These conditions can persist for several days as a tropical cyclone or monsoon low moves through the area.

Between 1969 and 2010, 23 tropical cyclones passed within 200 km of Christmas Island. On average, this equates to about one or two every two years.

On 21 March 2014, tropical cyclone *Gillian* passed just to the north of the island generating a period of gales and a maximum wind gust of 52 knots. Heavy rainfall also affected the island with 181 mm falling in a 24-hour period.



Severe Tropical Cyclone *Gillian* on March 22, 2014. Image courtesy, NASA



Tropical cyclone *Gillian* track map



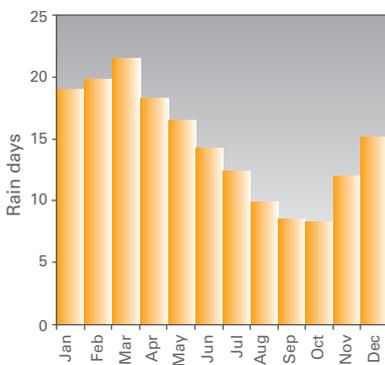
Christmas Island. Image courtesy, Department of Immigration and Border Protection

## Low cloud and fog

Low cloud is a significant hazard at Christmas Island Airport due to the surrounding topography, the elevated position of the aerodrome (almost 1000 ft above MSL) and the tropical maritime environment. Periods of low cloud can occur at any time throughout the year and with the wind from any direction.

During the dry season, the southeasterly trade winds dominate. Although conditions are less humid, this wind direction is highly conducive to low cloud formation, so cloud will often lie over the airport with bases between 1000 and 2000 feet above the aerodrome. The cloud bases can drop to well below 1000 ft, with the base lowering to aerodrome level (fog) at times.

During the wet season, extended periods of low cloud are common. This is particularly true during rain events and for significant periods of time after rain, when cloud often lowers to runway level. During active bursts of the monsoon it is not unusual to experience cloud at aerodrome level almost continuously for several days.



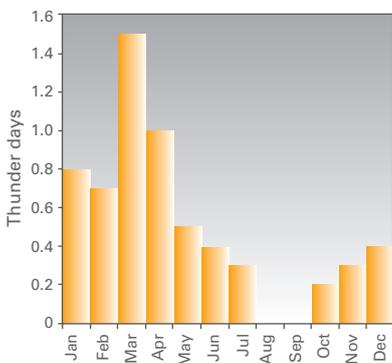
Average rain days per month at Christmas Island, 1973–2013

## Thunderstorms and precipitation

Rain occurs year round at Christmas Island, with the island having an average annual rainfall of more than 2 metres. The average number of rain days varies between approximately 10 and 20 per month, depending on the time of year. The wettest months are between December and June. Rain can be very heavy at times during the wet season.

Thunderstorms are observed via remote sensing methods as there are no manual observations made at the aerodrome, in addition to occasional pilot reports. Thunderstorms are more frequent during the wet season.

Rain and thunderstorms can reduce visibility and cause low cloud conditions regardless of wind direction.



Average thunder days per month at Christmas Island, 1973–2013

## Low-level turbulence and wind shear

The rugged topography of Christmas Island is conducive to the generation of low-level turbulence and wind shear. However, most of the time winds are light to moderate and significant turbulence is relatively uncommon.

Moderate turbulence is generated at times by strong monsoonal winds, or when a tropical low or a tropical cyclone is in the area. In a strong easterly flow, light to moderate turbulence and wind shear may be experienced near runway level due to the low hill adjacent to the eastern side of the runway.

Low level turbulence and wind shear is also experienced with large convective clouds such as towering cumulus (TCu) and cumulonimbus (Cb).

## Volcanic ash

Due to Christmas Island's proximity to the active volcanic region of Indonesia, it is possible, though not common, for the island to be affected by volcanic ash. When this occurs, warning products such as SIGMETs and Volcanic Ash Advisories will alert pilots to the presence of ash.



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