



Tonga Meteorological Service – Ministry of Civil Aviation

## **CLIMATE SUMMARY OF TONGA**

The Kingdom of Tonga has a tropical climate throughout the year which reflects its position being within the trade wind zone of the South Pacific.

### **RAINFALL**

The climate of Tonga is characterized by the contrast between a **wet season** (Nov-Apr) and a **dry season** (May-OCT). About 60-70% of the rain falls during the wet season. Rainfall in Tonga is mainly caused from processes from tropical cyclones and the movement of the South Pacific Convergence Zone (SPCZ).

The variation of monthly and annual rainfall over Tonga shows the influence of the SPCZ. The most northern islands of Tonga receive more rainfall (approx 2500 mm a year); this is owing to the seasonal proximity of the SPCZ, while the southern islands receive about 1700 mm of rainfall a year. Ha'apai group of islands receive less rainfall than in southern Tonga because of its location is in a relatively dry zone of Tonga. The wettest month is March and the driest month varies between June and July.

The two main causes of rainfall variation in Tonga are the occurrence of tropical cyclones, which can result in unusually wet periods, and an El Nino event which can cause prolonged droughts particularly in central and southern Tonga.

### **TEMPERATURE**

Tropical temperatures show some dependence upon latitude. Mean annual temperature for Tonga range from 23-28°C and the mean humidity persists around 75%. Over northern Tonga, mean annual temperature at Niuafu'ou is about 27°C while in southern Tonga it is about 24°C. This variation shows an increase in daily and seasonal variations with increasing latitude.

Daily maximum temperatures are highest generally in February which makes it the hottest month, and the coolest month is July or August even though some extreme low temperatures often occur in September. The highest temperature on record is 35.0°C on the 11<sup>th</sup> February 1979 in Vava'u. A maximum temperature of more than 33°C is seldom measured especially in southern Tonga, however in February 2002 a new record for Nuku'alofa was set when a maximum temperature of 33.1°C was recorded.

The lowest temperature on record is 8.7°C on 8<sup>th</sup> September 1994 in Fua'amotu. Temperatures of 15°C or lower are usually measured during the dry season and are more frequent in Southern Tonga than in the north.

## **WIND**

Winds over Tonga are dominated by the south-east trades all year round. The trade wind strengths are normally light to moderate, however they tend to be strongest during the period from about May – Oct especially in northern Tonga while little variation of the east to south-east winds throughout the year in southern Tonga. Wind speed norms range around 12 to 15 knots from east to southeast, although tropical cyclones can bring strong winds during the cyclone season (Nov-Apr).

## **TROPICAL CYCLONES**

Tropical cyclones are confined to the wet season which is also called the **Cyclone Season**. February is the month with the highest frequency of cyclone occurrence in Tonga. The average number of tropical cyclone to affect Tonga in a season is between 1 and 2. In the event of an El Nino, the frequency of cyclone occurrence increases. During the cyclone season 2002-2003 which was also an El Nino year, 3 cyclones out of about 5 that affect at least part of Tonga caused severe damage to Southern Tonga.

## **DROUGHTS**

During a normal year rainfall in the dry zone of Tonga mainly Ha'apai group of islands and Southern Tonga are lower than normal during the **Dry Season** but especially towards the latter part of the season. A few months of below average rainfall can cause drought effect. The persistence of prolonged droughts in Tonga is also associated with the El Nino event which also results in below average rainfall for Tonga. These conditions can be severe if the event is strong and particularly if the precipitation during the wet season has been lower than usual. The 1997/1998 strong El Nino event caused drought condition in Tonga especially affecting Tongatapu and Ha'apai groups.

## **Floods**

Flooding in Tonga is not common but when it occurs it is mainly due to prolonged heavy rain, storm tides and heavy sea swell. These flooding often occur during the wet season (November-April) and are mostly associated with the passage of a tropical cyclone or a tropical low. However, periods of abnormally high rainfall persisting for more than three months are rare. The areas mainly affected are the coastal low-lying areas which are mainly the southern Tonga and the Ha'apai group of islands.