



## Tonga Meteorological Service

Telephone: 35 355  
Fax: 35123

Email: [metstaff@met.gov.to](mailto:metstaff@met.gov.to)  
URL: <http://www.met.gov.to>

### Climate Summary of Tonga

Tonga lies within the South-east trade wind zone of the South Pacific. Wind speeds over its surrounding oceans average around 12 knots. Strong winds are not common except during tropical cyclone passages in summer (November – April) and gales from eastward migrating high pressure systems during winter (May – October). On average, 1 tropical cyclone affects Tonga annually.

#### Rainfall

The rainfall regime is very much associated with the semi-permanent South Pacific Convergence Zone (SPCZ). An area of convergence between the equatorial easterly trades and the sub-tropical south-easterlies. A pronounced wet season is noticeable from November to April (also the cyclone season) which contributes to about two thirds of the total annual precipitation and a dry season from May to October. Rainfall is highly variable from year to year with abnormally low or high rainfall persisting for more than three months extremely rare. ENSO has a negative impact on Tongan climate patterns resulting in drought conditions, particularly in Central and Southern Tonga and enhanced cyclone activity.

#### Rainfall trend

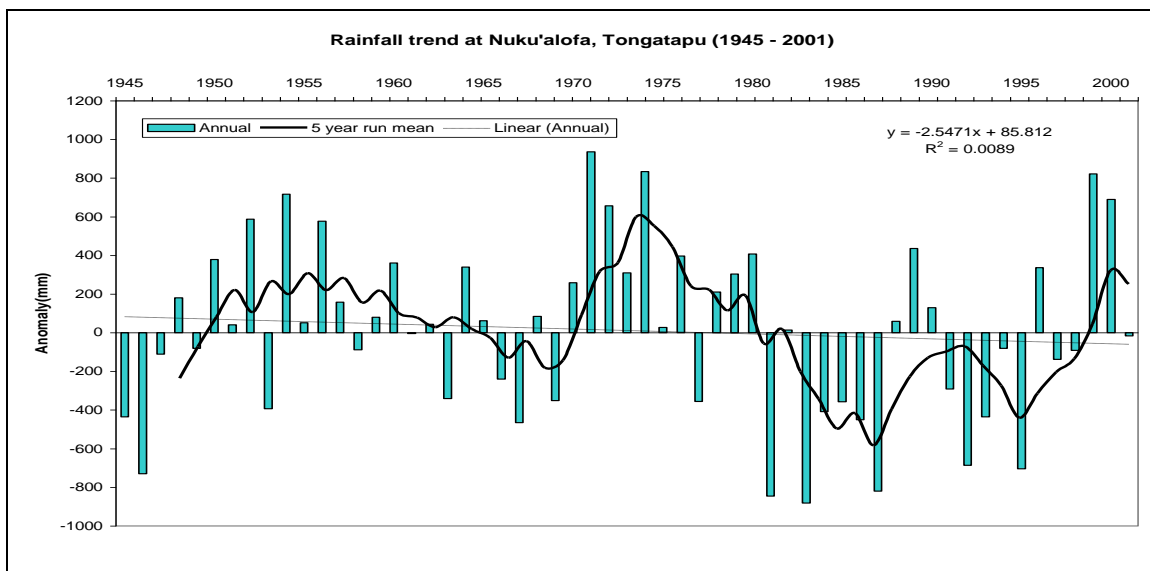


Figure 3: Annual rainfall anomalies and trends for Nuku'alofa

## Temperature

Temperature variations throughout the Kingdom show an increase in daily and seasonal variations with increasing latitude. Mean annual temperatures vary from 26°C at Niuafu'ou and Niuatoputapu (~15s) to 23°C on Tongatapu (~21s) with a diurnal and seasonal range of 6°C and 2°C and 6°C and 5°C respectfully.

## 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.