Kilateli Epu and Hilia Vavae, Tuvalu Meteorological Service

Climate, climate variability and change in Tuvalu

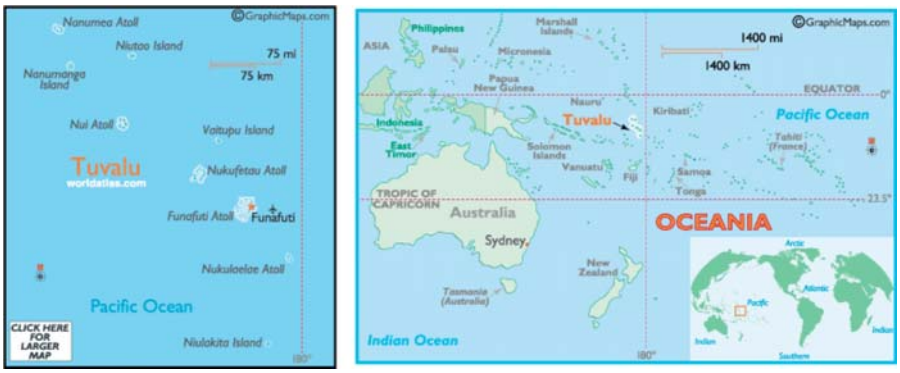

Figure 1. Location of Tuvalu in South Pacific.

Introduction

Tuvalu is a small independent nation made up of a chain of nine reefs and atolls in the Polynesian region of the South Pacific (Fig. 1). With less than 12,000 inhabitants, Tuvalu has the third smallest population of any independent country. It is also the second smallest, with land area of only 26 km^2.

Climate Drivers

The El-Niño-Southern Oscillation (ENSO) has a significant impact on the wet season. ENSO also affects the number of tropical cyclones in the region. This is because sea surface temperatures northeast of Tuvalu are usually warmer than normal for an El Niño, and cooler during a La Niña.

The South Pacific Climate Zone (SPCZ) drives the annual cycle of rainfall in Tuvalu. During El Niño, the SPCZ tends to move northeast resulting in warming of sea surface temperature around the region. Tuvalu experiences heavy rainfall and even tropical cyclones at this time.

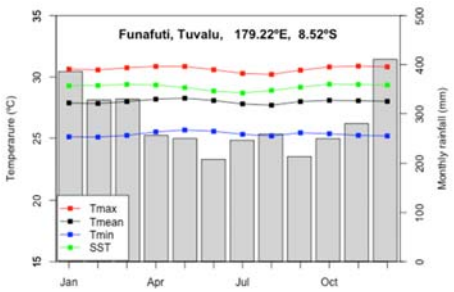

Figure 2. Mean seasonal cycles in temperature and rainfall at Funafuti.

Data availability and homogeneity

There are four rainfall stations and one temperature station with high quality, long-term records that can be used for climate change monitoring in Tuvalu. All records have been tested for inhomogeneities and corrected where appropriate.

Seasonal Cycles

The climate of Tuvalu is characterized by two distinct seasons; a wet season from November to April and a dry season from May to October (Fig.2). This strong seasonal cycle is driven by the strength of the SPCZ. Mean annual rainfall of around 3500mm is received in the south of Tuvalu, including Funafuti.

Funafuti has virtually no seasonal cycle for maximum and minimum temperature, with maxima averaging 30-31°C and minima 25-26°C, all year round (Fig. 2.)

Observed inter-annual variability

High inter-annual variability in rainfall is due to the impact of ENSO (Fig. 3). In an El Niño year, the SPCZ moves to the northeast and rainfall is higher during June to November. Considerable decadal variability is also evident.

In contrast to rainfall, inter-annual variability in mean temperature is very small in Funafuti (Fig. 3). Consequently, a warming trend of around 0.2 °C/decade is clearly evident. This amount of warming is slightly greater than the global average. Rates of warming in maximum and minimum temperatures area similar to those of the mean.

Waves crash on to the western side of the atoll from the lagoon, looking north from the Vaiaku wharf.

Impacts and extremes

Tropical cyclones (TCs) are the main extreme events that affect Funafuti. TCs bring strong winds and heavy rainfall, resulting in flooding and landslides in some cases. The cyclone season generally lasts from November to April. TCs are more frequent during El Niño (average of 1.6 per season) and very rare in La Niña years (average of 0.13 per season).

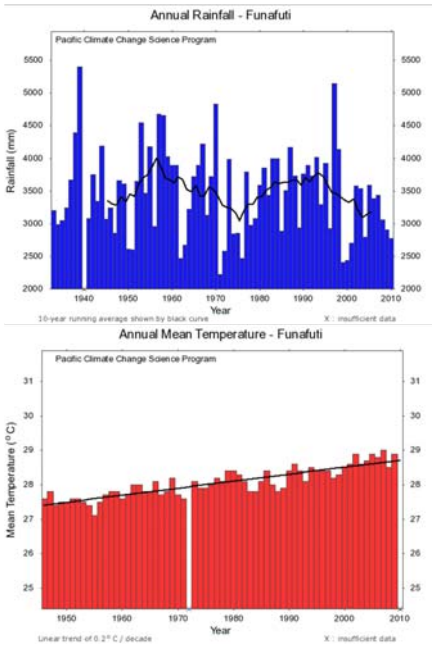

Figure 3. Homogeneous annual (top) total rainfall and (bottom) mean temperature at Funafuti.

Local perceptions of climate change

Climate change is a major topic of discussion in Tuvalu, even in primary and secondary schools. Many people are intending to migrate in response to climate change. However, most of the older generation do not want to move as they believe they will lose their identity, culture, lifestyle and traditions. Younger generations intend to migrate for the sake of the future generations.

Australian Government AusAID
Australian Government Bureau of Meteorology
Australian Government Department of Climate Change and Energy Efficiency
CSIRO

Further information:
> contact: Hilia Vavae> phone: +688 20736 > email:hiliavave@yahoo.com