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Climate, climate variability and change of Republic of Palau

Introduction

Established as an independent country on Oct 1, 1994, the Republic of Palau is situated at 7°N and 134°E, approximately 1987 km north of Australia.

Palau is south of the normal typhoon belt of the Western North Pacific, and consequently typhoons rarely hit Palau. However, a few times per year tropical storms and typhoons pass North of Palau – usually several hundred miles away – bringing heavy rains and strong winds.

Figure 1: Map of the Republic of Palau

Data availability and homogeneity

The station in the Republic of Palau (ROP) with the longest history of climate records is Koror, located on a small island just south of the main Island of ROP. The rainfall data has been homogenized and the records go back to 1973.

Heavy rainfall also generated from typhoon Utor (2001) or tropical storm may cause landslides.

Climate Drivers

❑Monsoon

Active between June and August. Strong year-to-year variability of rainfall during wet season.

❑Tropical Cyclones

Tropical Cyclone (TC) activity is generally low with more TCs during La Niña compared to El Niño.

❑ El Niño & La Niña

El Niño has the most significant impact on Palau: during the dry season the rainfall amounts are much lower .

Swell and extreme high tides may also damage taro patches.

Seasonal Cycles

The seasonal cycle of rainfall shows a mixture of influences: sometimes in the reach of the NH monsoon with marked wet seasons (JJA) and generally high rainfall otherwise because of its location within the Pacific Warm Pool. The figure below shows the effect of ENSO with a shortened wet season for Koror during El Niño and prolonged wet season during La Niña. The dry season extends to a 6 month period without rainfall during El Niño.

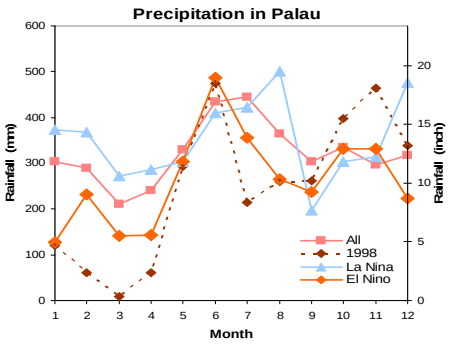

Figure 2: Annual cycle of precipitation for Koror, Palau, for El Niño (orange), La Niña (blue) and all years (pink). The strong 1998 El Niño year is drawn separately (brown).

The temperature has very little seasonal variation. The average daily temperature is 28°C (~82°F) throughout the year and there is only an 0.8°C difference between the hottest and coolest month. The average Relative Humidity is 82%.

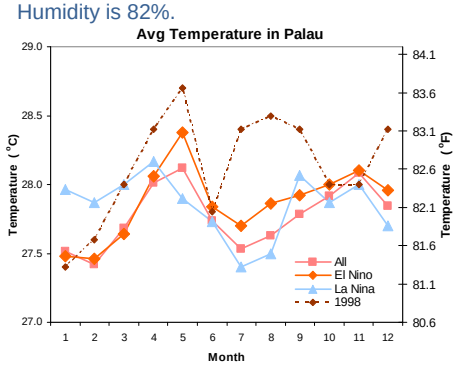

Figure 3: Annual cycle of Mean temperature for Koror, Palau, for El Niño (orange), La Niña (blue) and all years (pink). The strong 1998 El Niño year is drawn separately (brown).

During the months of December & January precipitation is heavy, and February, March & April are the driest months of the year. Winds are generally moderate, and the NE trades prevail from December through to March. During April, the frequency of trade winds decreases, and there is an increase in frequency of E winds. In May, the winds are predominantly from SE to NE.

Normal monthly precipitation exceeds 250mm (10in), and in some years each month has received at least 380mm (15in) or more.

Observed inter-annual variability and trends

The inter-annual variability in rainfall at Koror is high and it is mainly driven by ENSO.

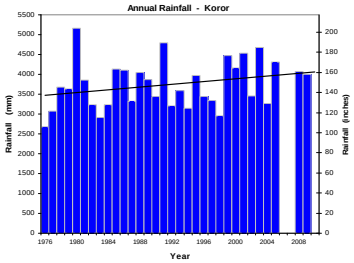

Figure 4: Time series of total annual rainfall and linear trend for Koror, Palau.

Overall there is an increasing trend in annual rainfall over the 32 year period, but the period is small and two significant La Niña years (1974 and 2010) are not included. The range in annual total rainfall is 2500mm, between 2700mm and 5200mm (in 1980).

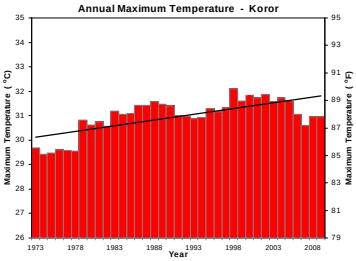

Figure 5: Time series of annual maximum temperature and linear trend for Koror, Palau.

There is an increasing trend in annual maximum temperature and decreasing trend in annual minimum temperature. The latter is mainly seen during the drier season.

Impacts and extremes

Typically, if a large typhoon or tropical storm passes between Guam & Yap, (i.e. 350-500 miles from Palau) this generates heavy swell that may have sufficient strength to damage reefs, kills corals and displace fish.

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