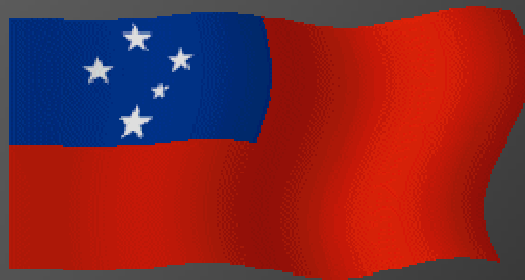


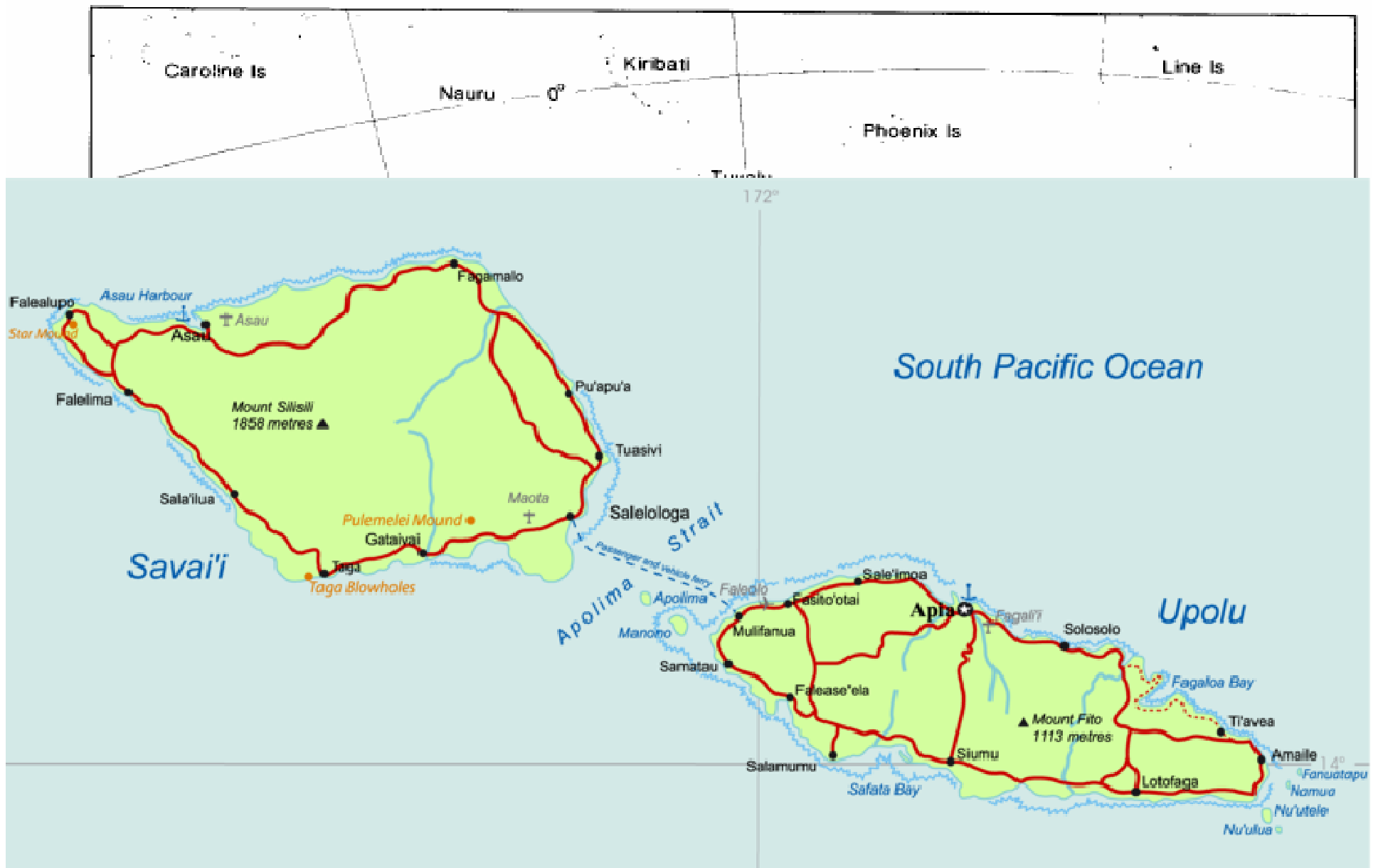
# CLIMATE, ENSO AND SPCZ IMPACTS IN SAMOA



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Climate and Ozone Services  
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Ministry of Natural Resources and Environment.

# Outline

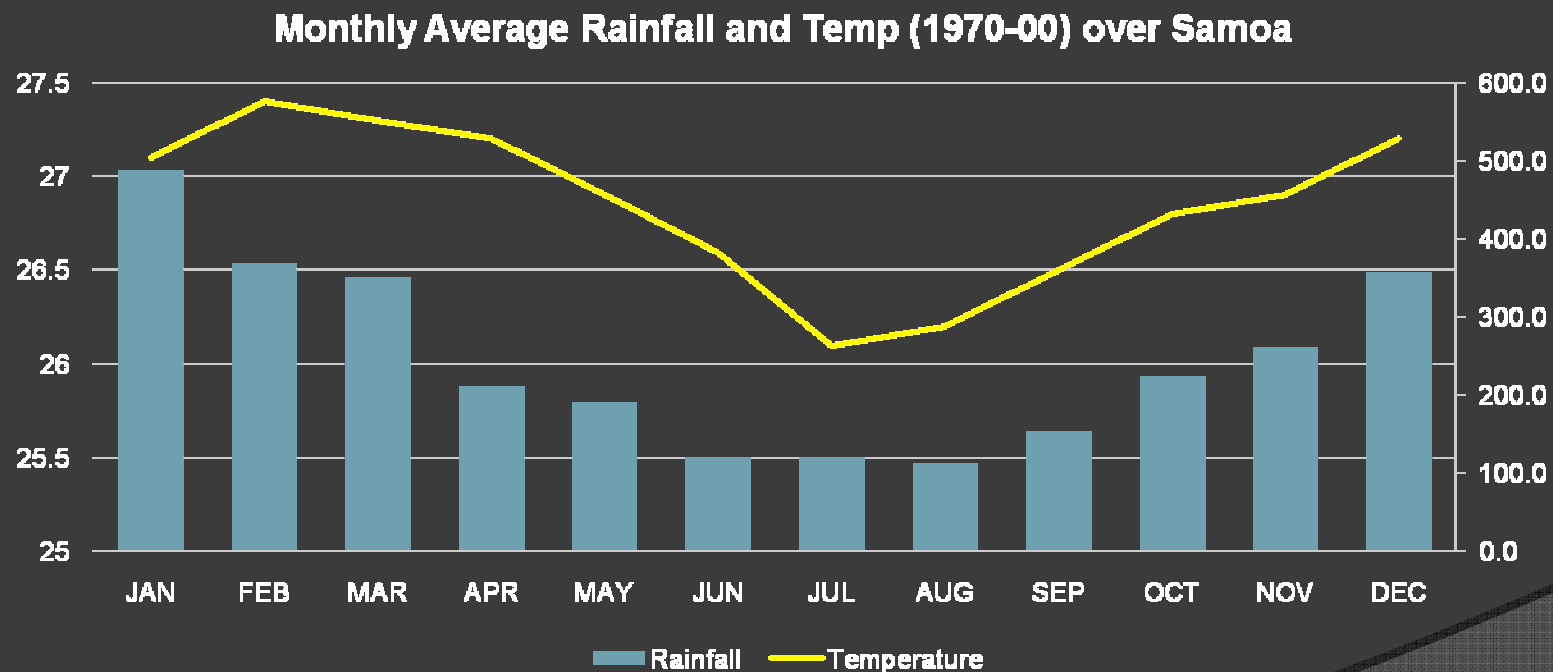
1. Background Information
2. Climate and main influences (topography)
3. Climatology – Rainfall, Temp, TC, RH, winds
4. Tropical Cyclone Distribution
5. ENSO impacts
6. SPCZ impacts



**Figure 1** Location of Western Samoa in the South-west Pacific Ocean

# Climate and seasons

- Samoa's tropical climate is divided into 2 seasons
- The two seasons are characterized by rainfall and temperature seasonal trends.

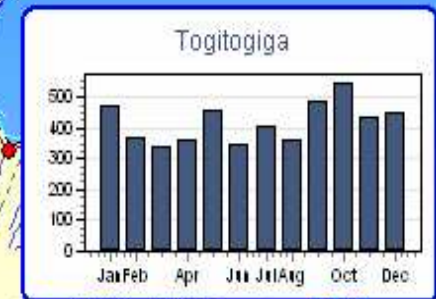
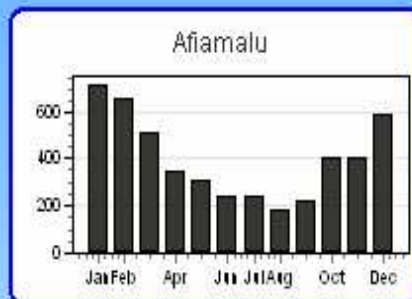
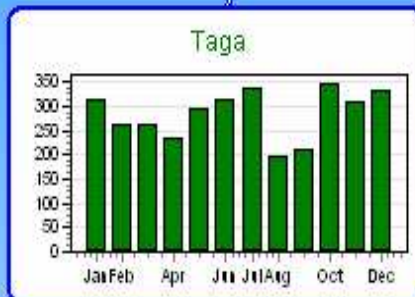
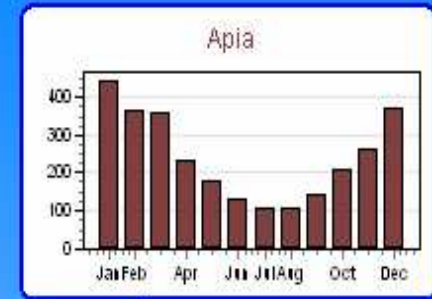
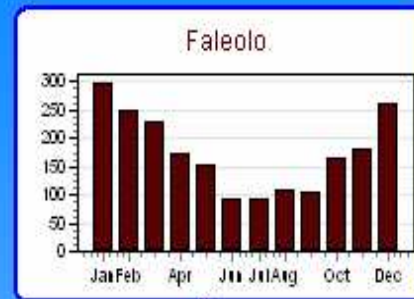
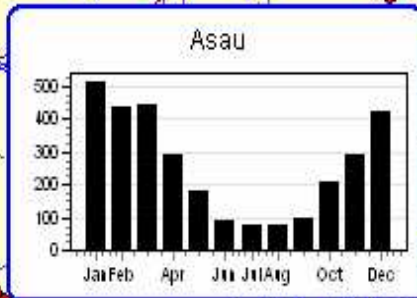
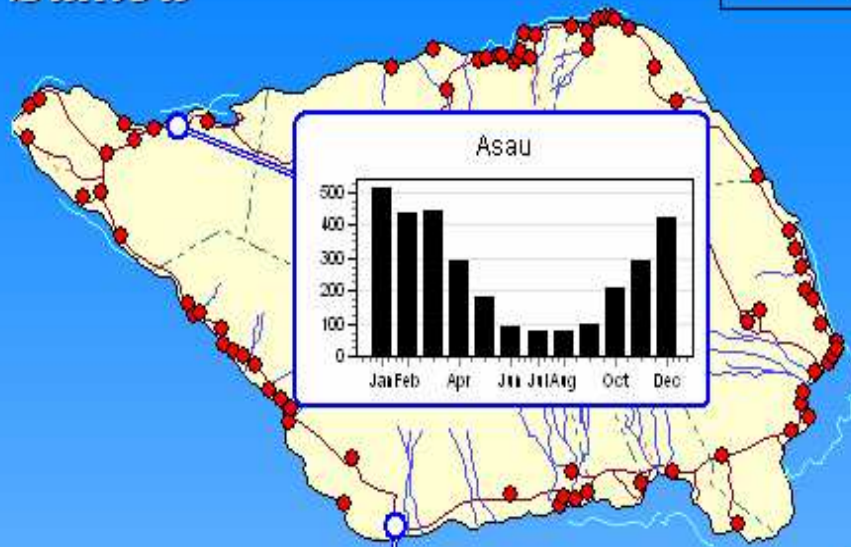


1. Hot and wet (November to April)
2. Cool and dry (May to October)

# Monthly rainfall climatology

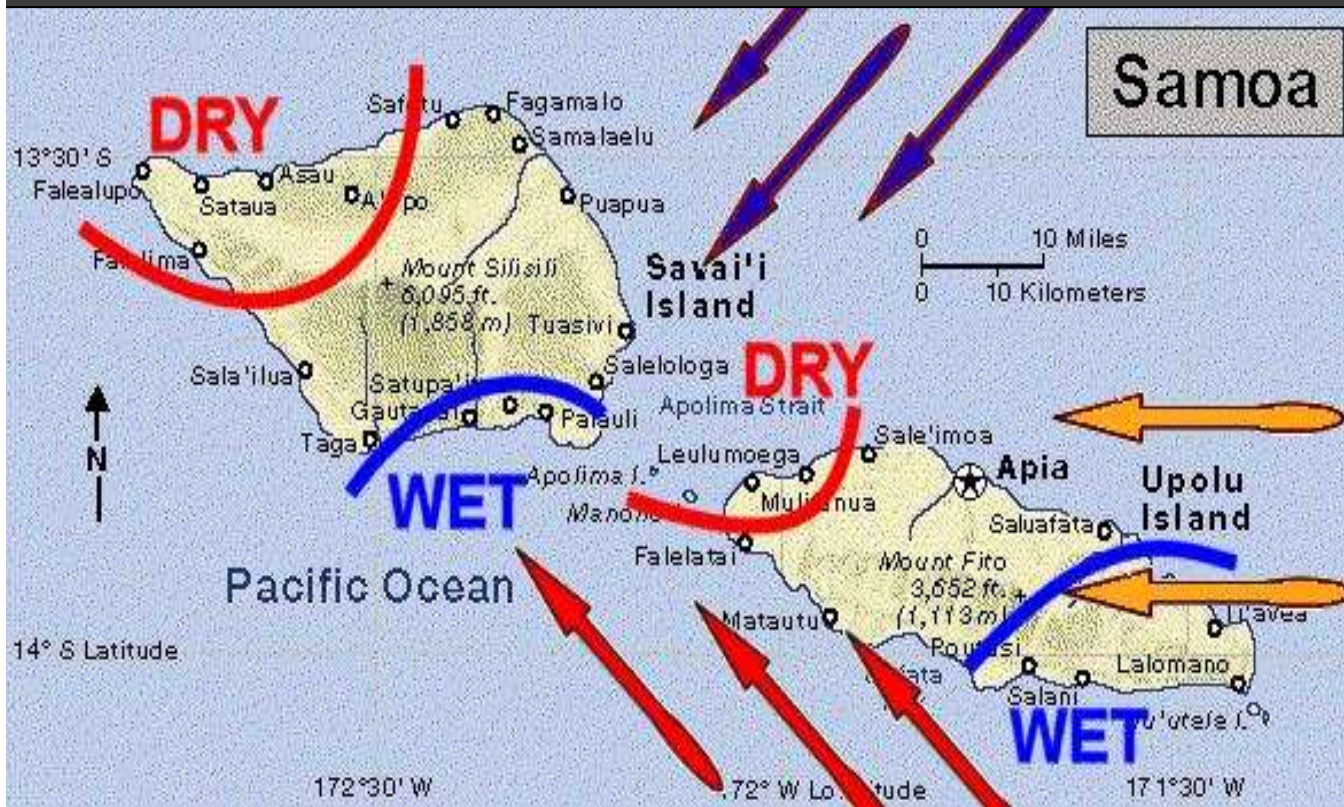
*Samoa*

Monthly average values



Australian Government  
Bureau of Meteorology

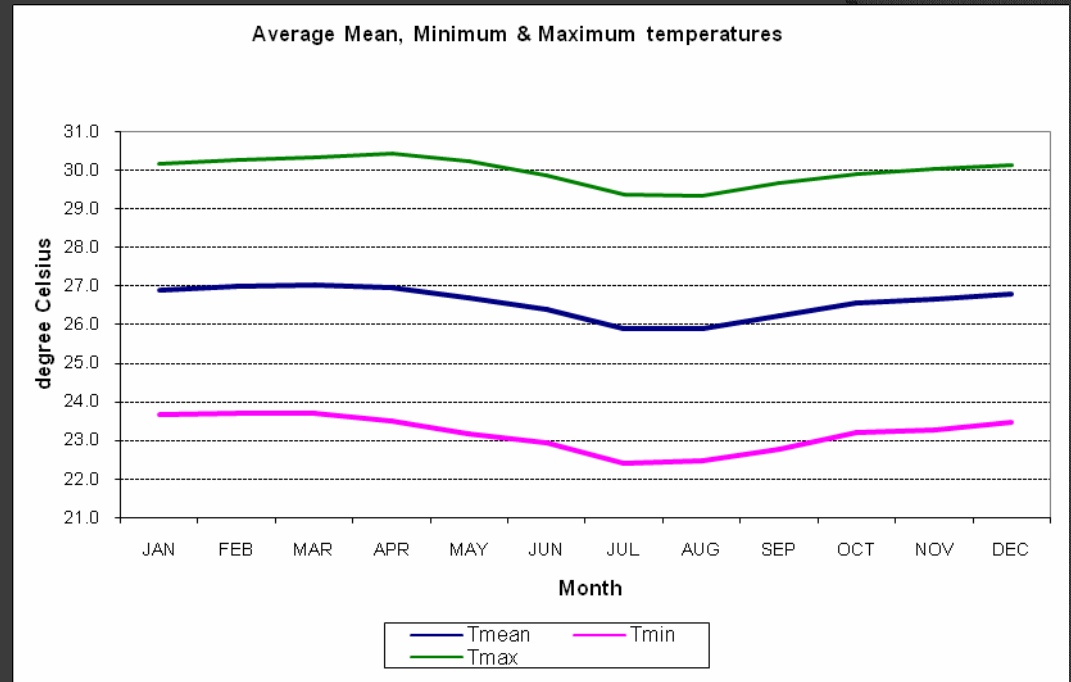
# Effect of Topography on Precipitation



- Rainfall is influenced by the topography as the normal increase in rainfall with height is modified in elevated areas which are exposed to the prevailing winds.
- Mountain ranges determine the distribution of rainfall due to predominant wind direction.
- Wet areas generally south east.
- Relatively drier areas generally north west.

# Seasonal temperature trend

- Air Temperatures range from 24 to 30 degC
- Temperature range of ~ 6 °Celsius night-time to daytime.
- Highest temperature recorded = 35 °C.
- Lowest temperature recorded = 10.5 °C.
- ~ 1 °C seasonal variability.



## Humidity

Humidity is usually high (above 80%) all year round

# Winds

- ◉ The surface wind flow over the islands are mostly predominantly between northeast and southeast ranging from 45 to 75% of the time.
- ◉ During wetter part of the year where SPCZ is to the south of the island group the mean wind flow is easterly
- ◉ North-westerlies and south-westerlies are infrequent, occurring only 5% of the time.
- ◉ The northern sides of the islands are sheltered by hills from winds from the southern quadrant, so the frequency of the southerlies is lower than on the southern side of the islands.



# Tropical cyclones

- Conditions are most favorable for the development of Tropical cyclone between November to April (also the TC season)
- Tropical cyclones affecting Samoa usually form between latitudes 10° and 15° South.
- Samoa has medium risk on regional scale
- Risk is increased with abnormally warm wet seasons and with the development on an El Niño event.

# ENSO impacts

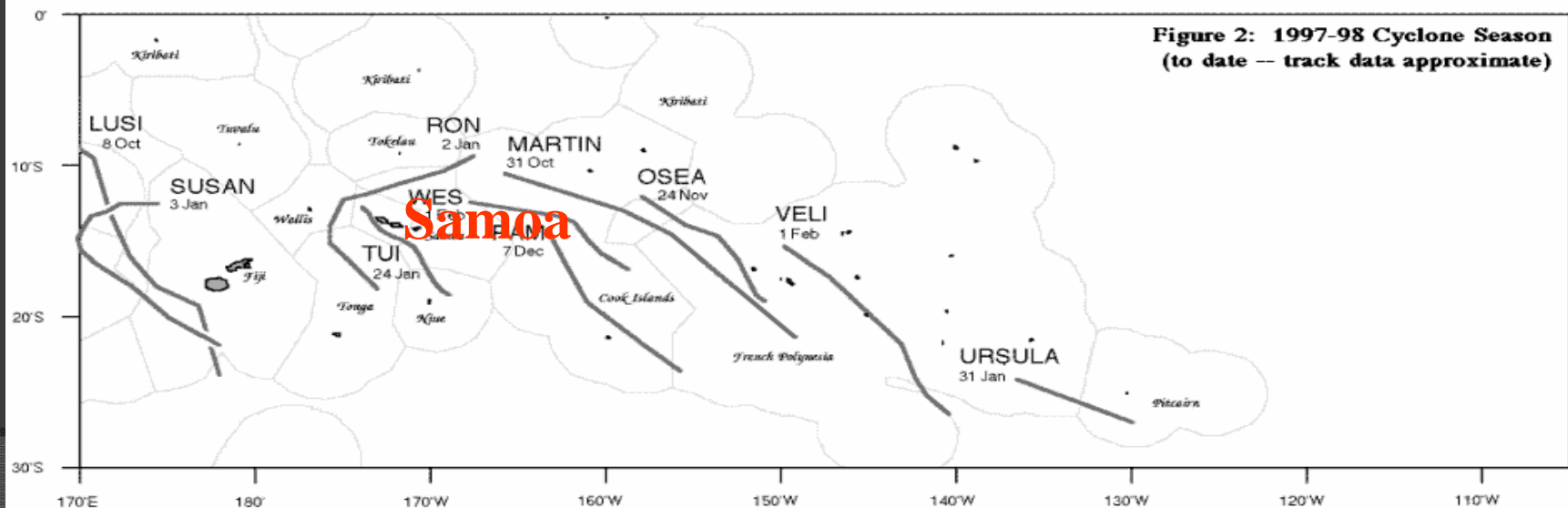
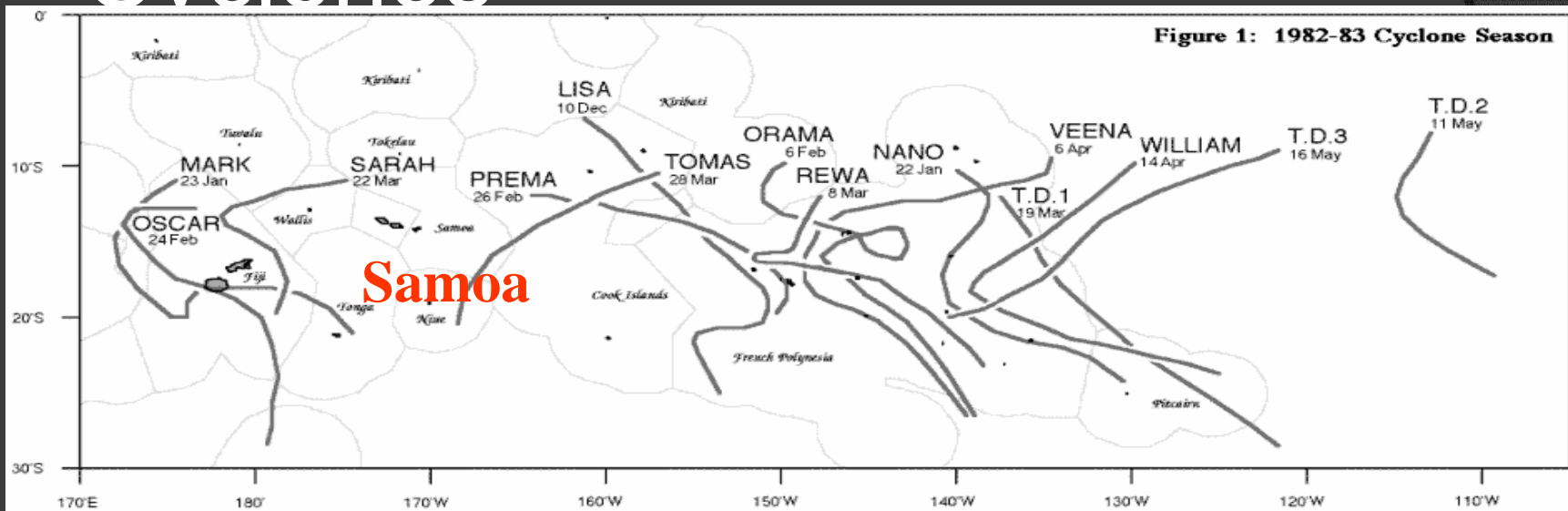
## EL NINO IMPACTS

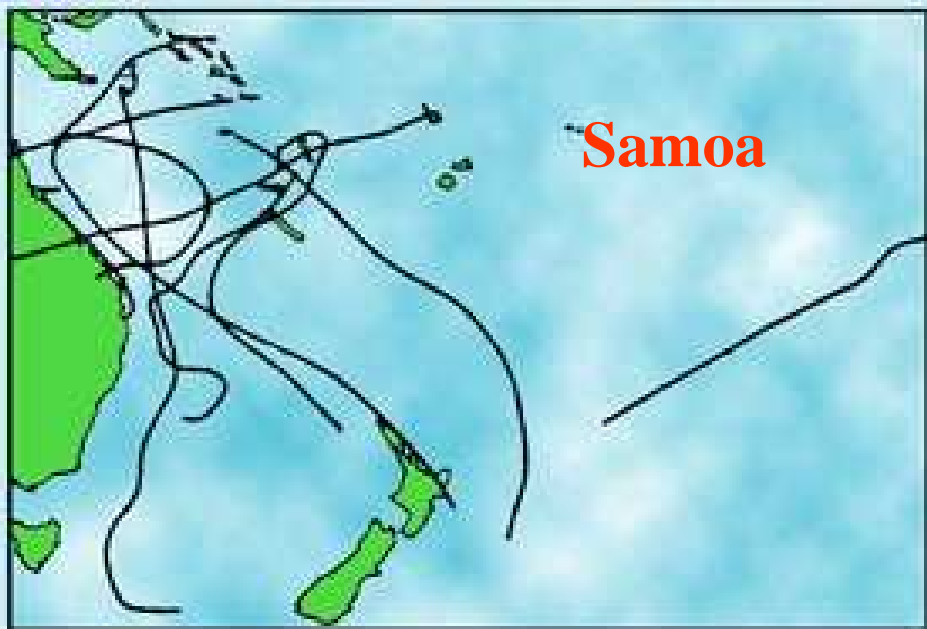
1. Below normal rainfall
2. Shortage of quality water supplies
3. Droughts and Forest Fires
4. Affect hydropower stations; energy generation
5. Increase number of TC
6. Crop Failures

## LA NINA IMPACTS

1. Above normal rainfall
2. Flooding
3. Increase water borne diseases – dengue fever, hepatitis and typhoid
4. Less number of TC (but more severe)
5. Affect major infrastructure eg transportation

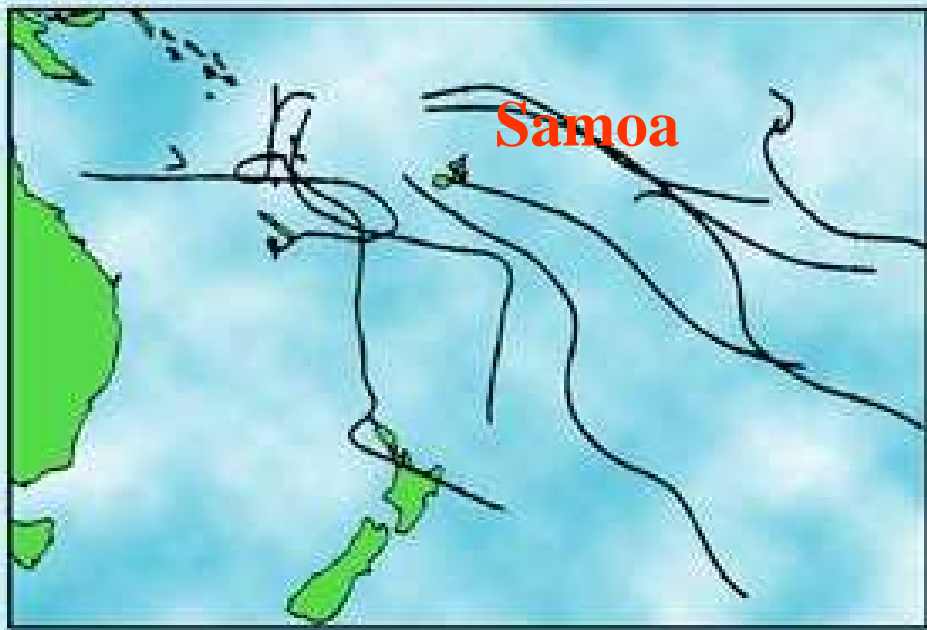
# ENSO impact on Tropical Cyclones





Tracks of tropical cyclones in the South Pacific in two contrasting years.

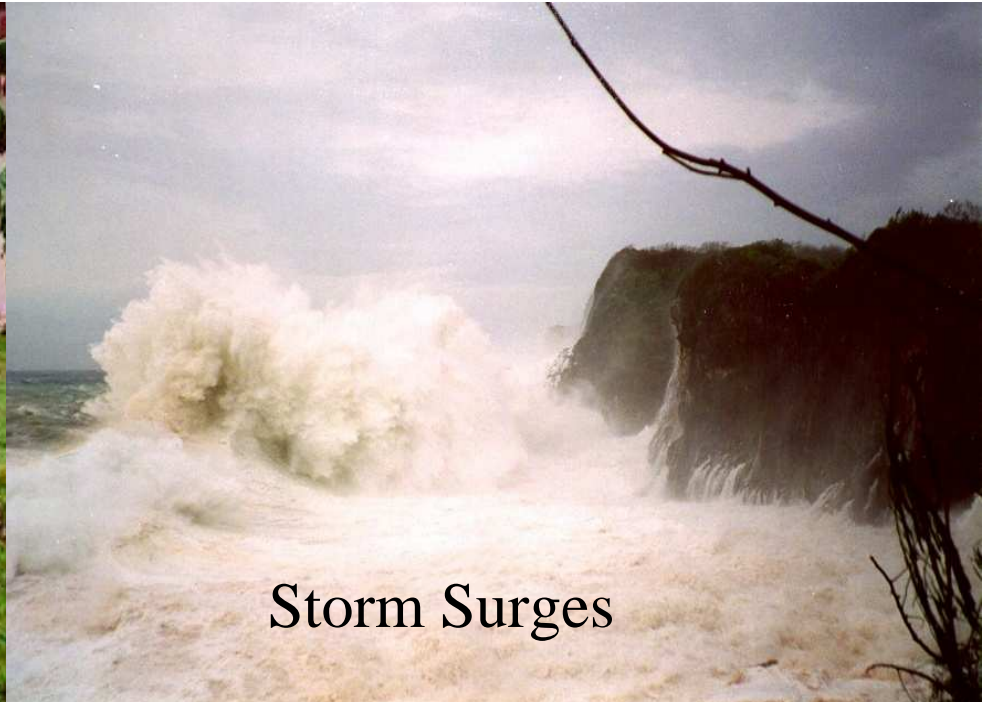
Top: 1975/76 season, cold phase of ENSO (La Niña).



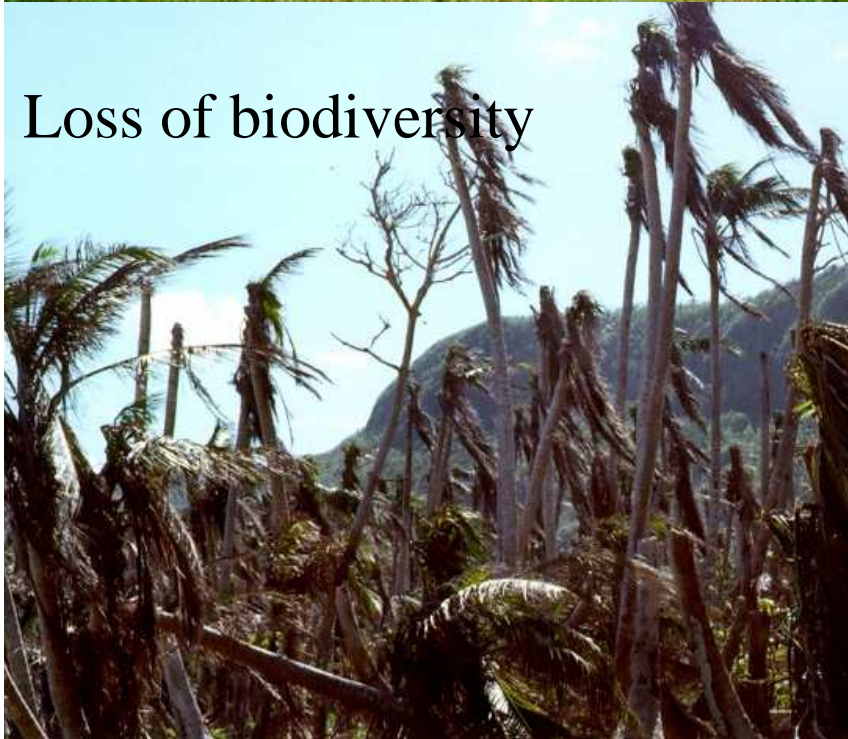
Bottom: 1976/77 season, warm phase of ENSO (El Niño).



Loss of crops & food supply



Storm Surges



Loss of biodiversity



Coastal erosion

# Impact on hydro power generation



Afulilo Dam



# Frequent flooding of Apia



Affect major infrastructure



Affect transportation



Affect businesses and trading

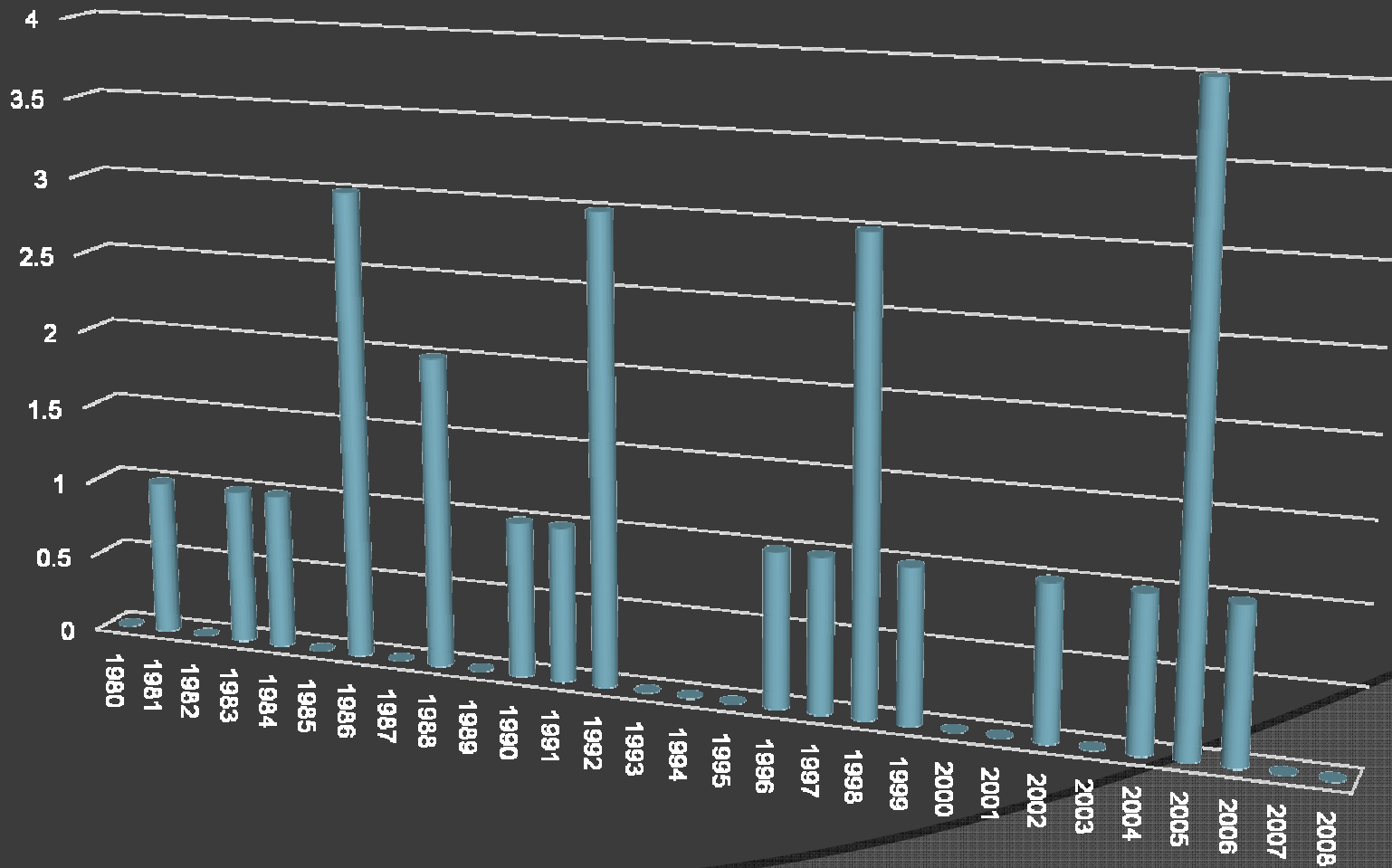


Affect residential homes and property

Feb 2006

# Tropical Cyclones

## Annual Number of Tropical Cyclones

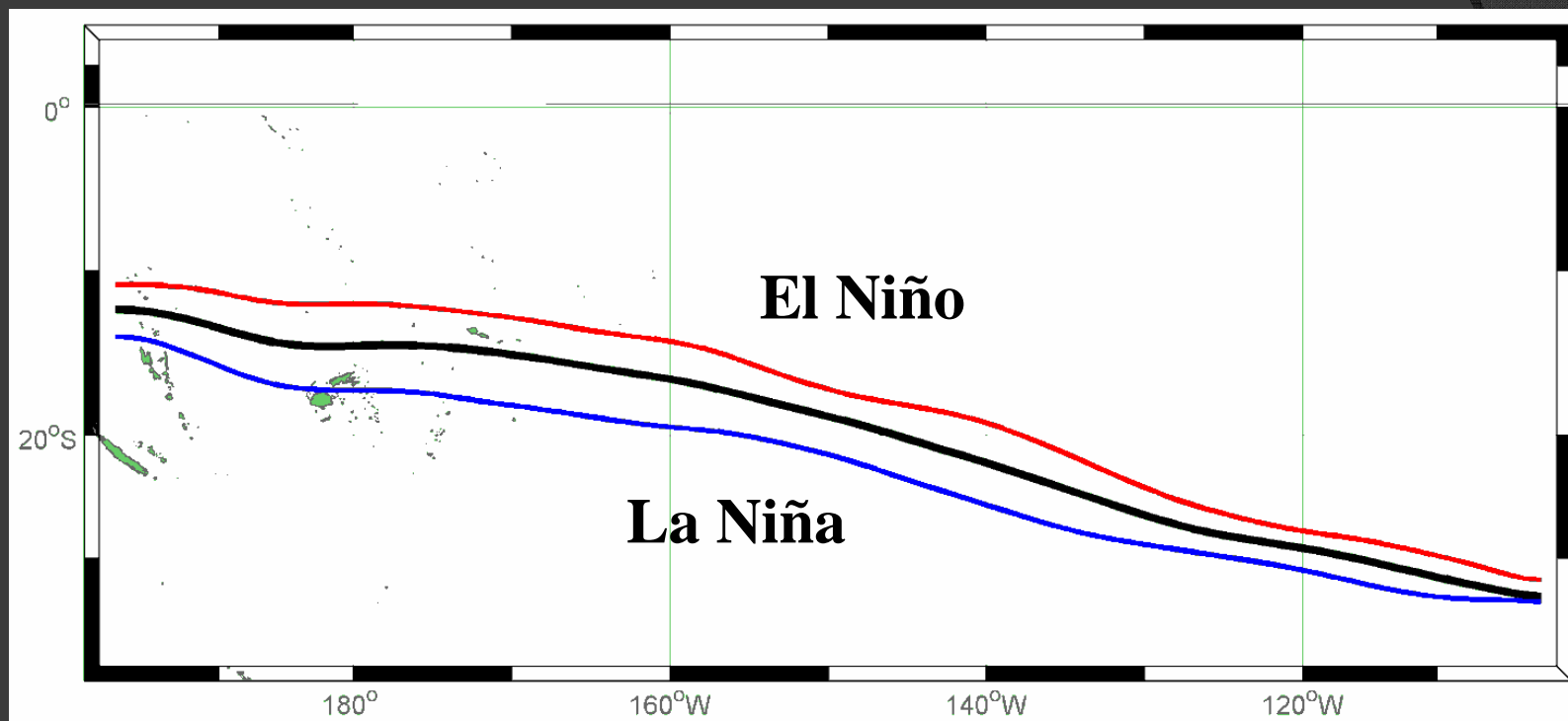




# Major USERS

- Farmer
- Fishermen
- Government Department
- Private sectors
- Community – constructions, schools

# SPCZ and ENSO



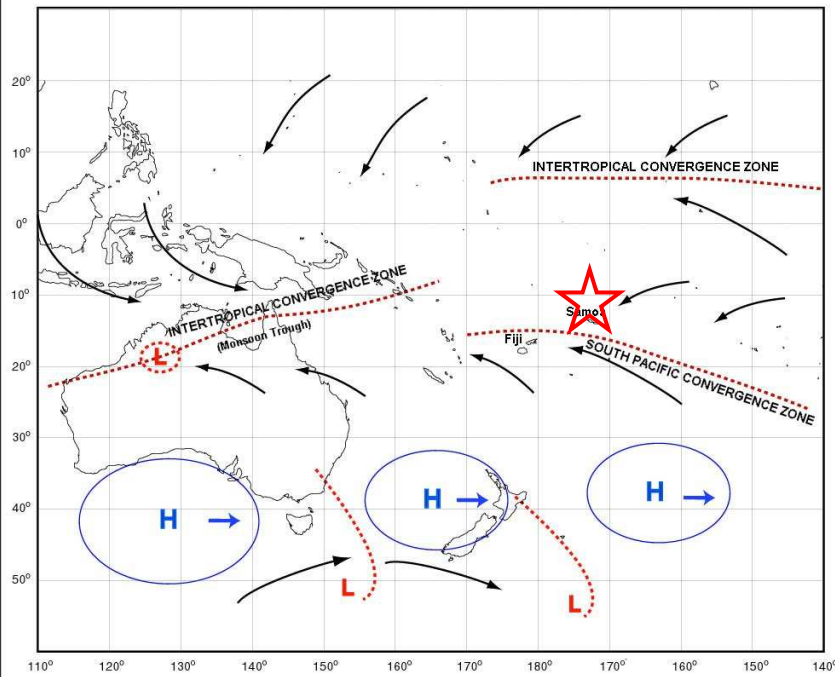
Variability by ENSO phase

El Niño – slightly north of Samoa

La Niña – displaced to the south

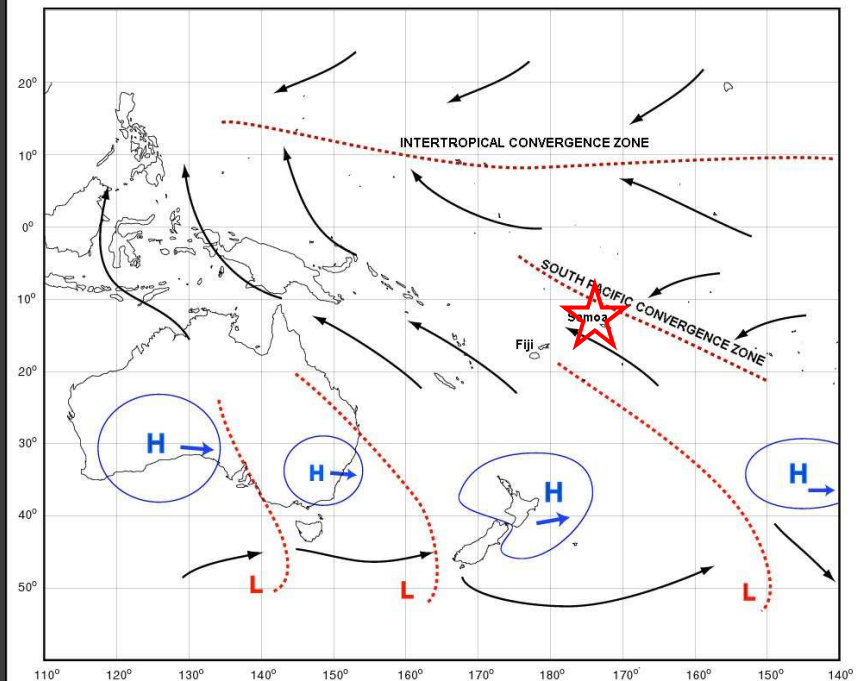
# SPCZ Impacts

Typical **summer** circulation features in the South-West Pacific (After Steiner, 1980)



Hot & Wet Season  
(Nov to Apr)

Typical **winter** circulation features in the South-West Pacific (After Steiner, 1980)



Cool & Dry Season  
(May to Oct)

# Recommendations

- ❖ Capacity Development
  - ❖ report writing training
  - ❖ attachment training
- ❖ Technical capacity building support on regional CLIMATE OUTLOOK
- ❖ Financial support for training to WMO levels

FAAFETAI