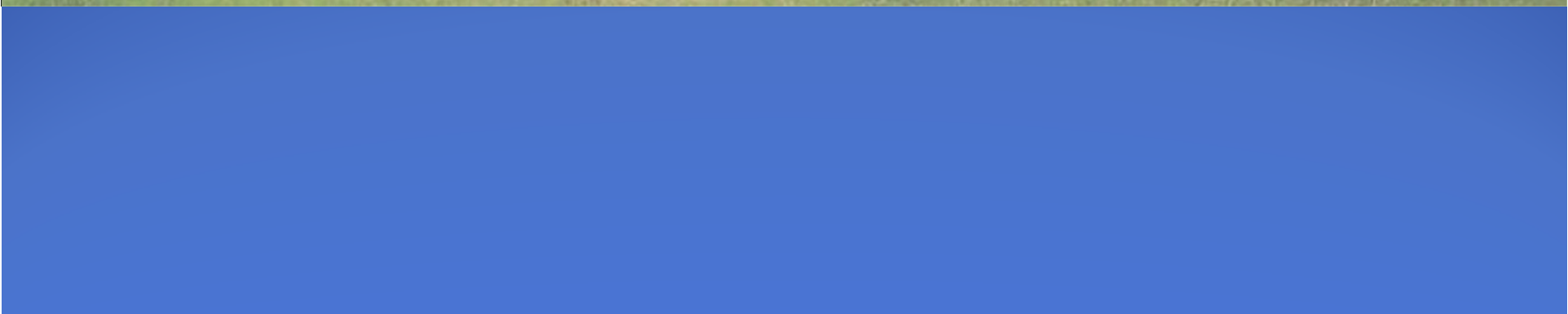




ACP S&T PROGRAMME



# Enhancing Farming through Weather and Climate Information **CARIBBEAN AGRO-METEOROLOGICAL INITIATIVE**





# Weather and Climate



- E.T. Joshua Airport Meteorological Office
  - Arnos Vale
- St. Vincent and the Grenadines

# Weather and Climate

- *Weather is the state of the atmosphere at a particular place and time. It is described by wind, temperature, pressure, rainfall, etc. which change hour by hour and day by day.*
- *Climate is the average weather of all the states of the atmosphere experienced over a long period of time (usually 30 years or more). Climate is determined mainly by the sun and the atmosphere.*

# What affects our weather

- June-November (Wet Season)
  - *Daily heating and cooling*
  - *ITCZ (Intertropical Convergence Zone)*
  - *El Nino/La Nina, 3-7 year cycle*
  - *Waves/troughs*
  - *Cyclones- Depressions, Storms and Hurricanes*

## December-May (Dry Season)

- *Dry spells*

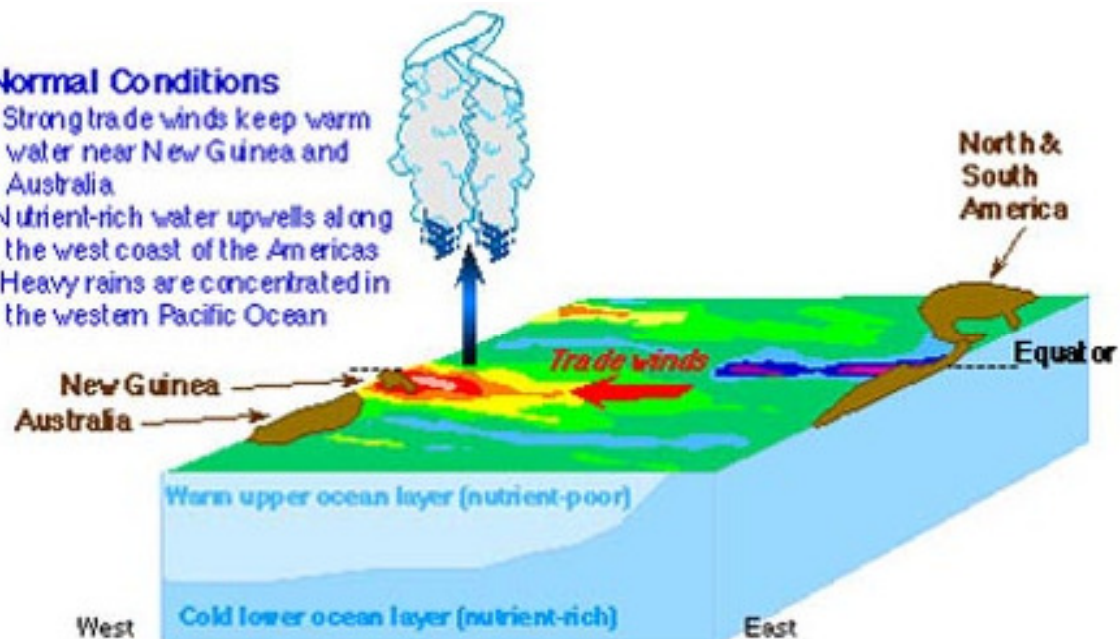
# Agro-meteorology

- *Meteorology- the science and study of the atmosphere, especially relating to weather.*
- *Agricultural (Agro) meteorology is the study of how weather and climate affect crops, livestock production and soil management .*

## EL NINO MODEL

### Normal Conditions

- Strong trade winds keep warm water near New Guinea and Australia
- Nutrient-rich water upwells along the west coast of the Americas
- Heavy rains are concentrated in the western Pacific Ocean



Normal weather conditions in the Pacific Ocean feature strong westerly trade winds, keeping waters off the coast eastern Australia and New Guinea warm, and maintaining deep water upwelling off the western coast of South America. During El Niño events, the trade winds weaken, and warm water moves eastward, upwelling is diminished and rainfall increased in the East Pacific.

# El Nino effects

El Niño originates in the tropical Pacific Ocean. When the trade winds relax in the central and eastern Pacific and upwelling of colder water from below is inhibited.

- Western Pacific Sea surface temperatures are 8 degrees warmer.
- More evaporation
- More precipitation
- Eastern Pacific and parts of South America receive relatively low rainfall totals.

# Weather in 2010

Affected by El Nino of 2009-2010

- Below average rainfall.
- Lowest monthly record of 2.7mm in February 2010
- Highest yearly total of 3029.5 mm in 2010 (25.44 mm~1 inch)

Distinction in the weather pattern within the same year for 2010

La Nina year 2010-2011

- Above average rainfall for the 'dry season' months
- February, March & April 2011- rainfall more than double averages



## E.T. JOSHUA-AIRPORT RAINFALL

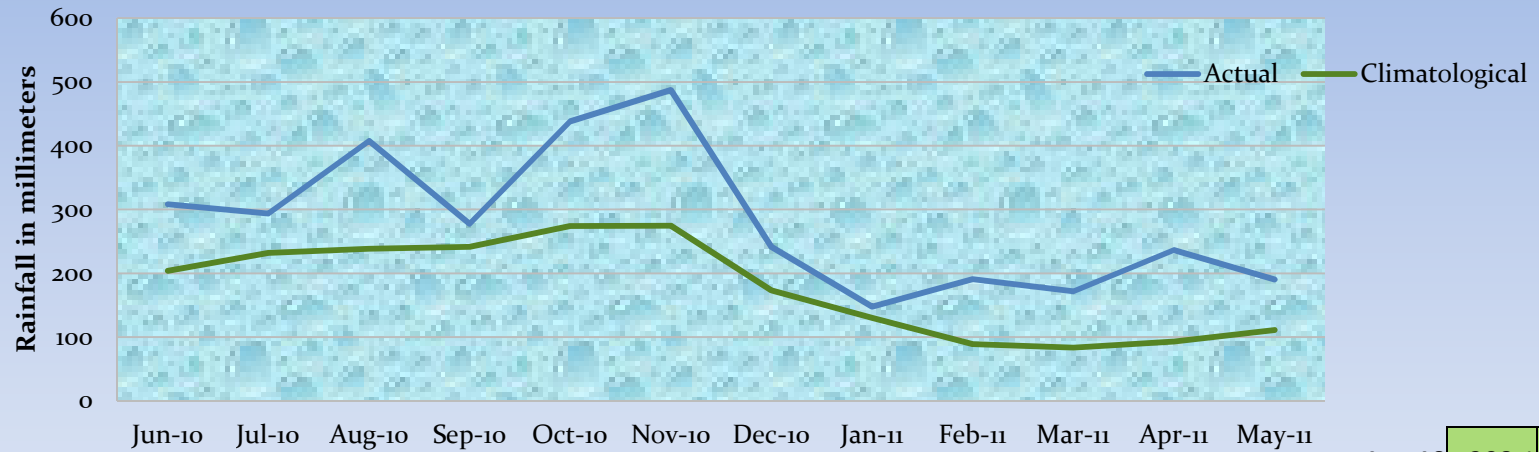


Fig. 1. Monthly average and actual rainfall

Jun-10	308.1	204.2
Jul-10	293.5	232.0
Aug-10	407.7	238.4
Sep-10	277.8	241.7
Oct-10	438.2	274.0
Nov-10	487.1	274.5
Dec-10	241.3	173.4
Jan-11	147.7	130.0
Feb-11	190.8	89.0
Mar-11	171.9	83.5
Apr-11	236.7	92.8
May-11	190.4	111.0

## *Consider:*

- *A rain-day as a climatic day in which the total rainfall passed a threshold of 1.0 mm or more (for vegetation sustenance).*
- *A climatic day being considered to begin at 8am on that day and ending at 8am the next day- a 24 hour period. Hence, the term 'daily' is a computation of all the measured rainfall for a climatic day.*
- *A dry-spell is an occasion of consecutive days with rainfall less than 1.0 mm*

# **“START OF RAINS”**

*Various methods to determine the start of productive rains; Evapo-transpiration rates, estimation of soil moisture, rainfall.*

*e.g. rainfall over a 30 day period.*

*The first occurrence of 10mm of rain within two successive days, and no 10- day dry spell in the following 30 days. (ave. annual/ave. rain-days is 2144.4 /214.5)*

*10/24 False starts - March and April*

*Productive start of rains - May 92% (22/24) times and 8% (2/24) June-2007 & 2002*

# Drought

Drought is when you have less rainfall than you expected over an extended period of time, usually several months or longer, resulting in a water shortage for some activity, group, or environmental sector.

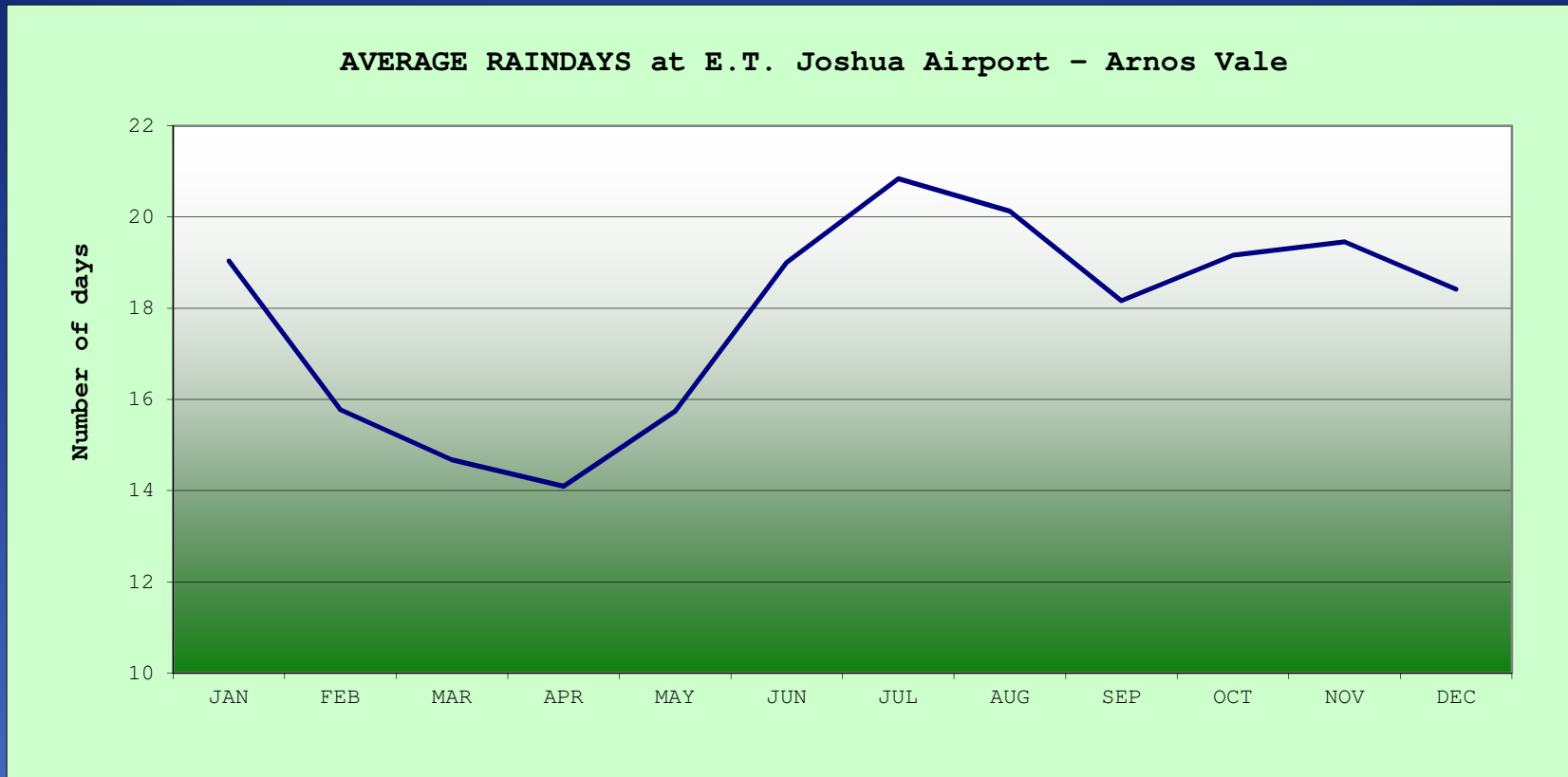


Fig. 2. Monthly average rain-days

### AVERAGE MONTHLY RAINFALL - E.T. Joshua Airport

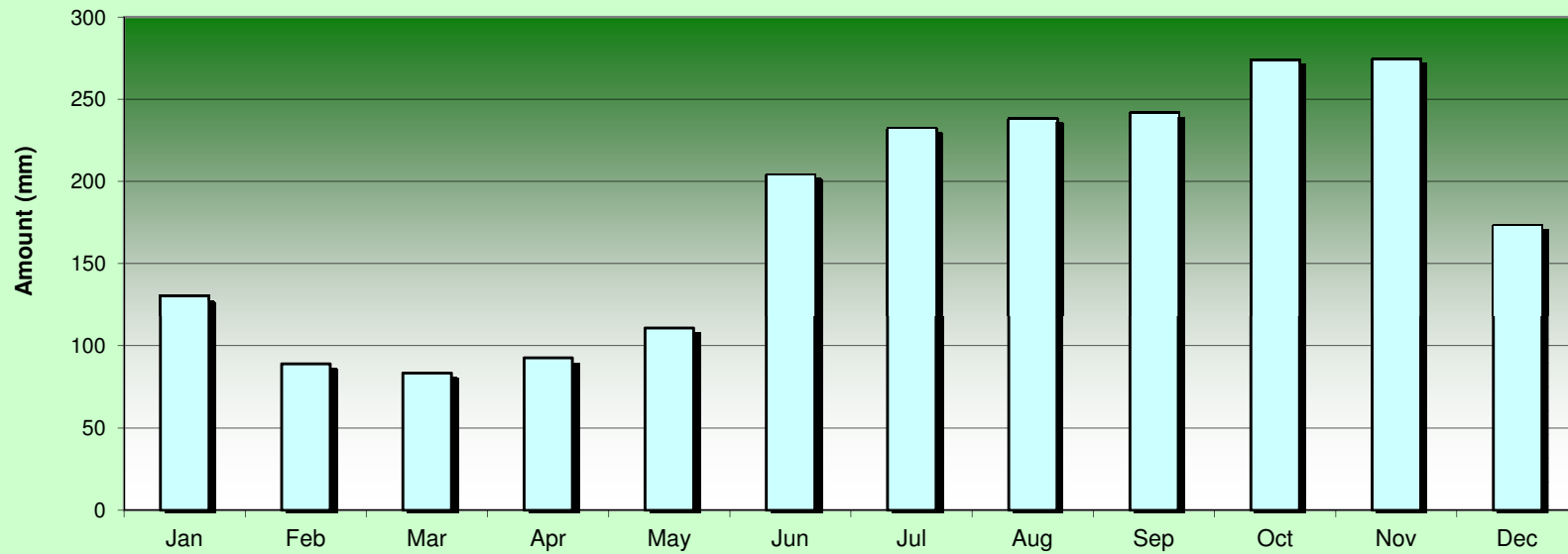


Fig. 3. Monthly average rainfall

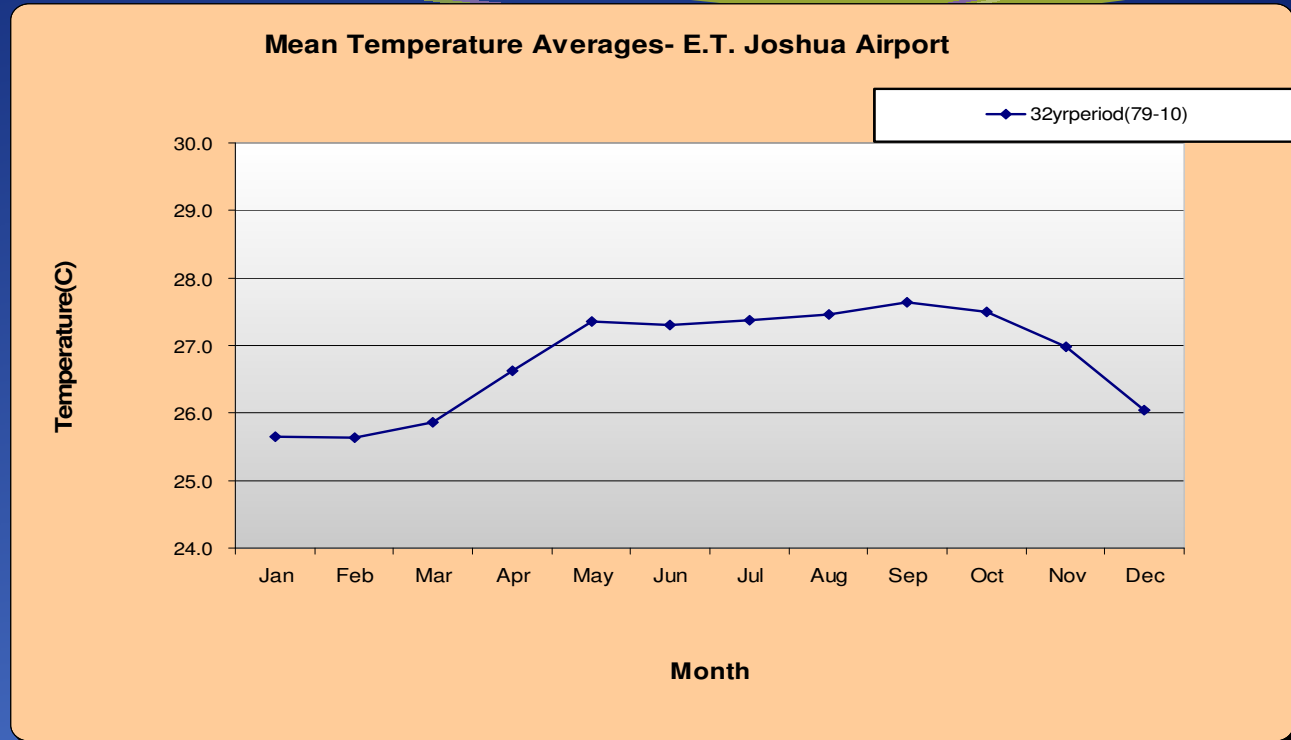


Fig. 4. Monthly mean Temperature

Maximum ranges between 29 - 33 degrees Celcius.

Minimum ranges between 20 - 24 degrees Celcius.

# Average Cloud cover

The amount of sunlight is a key factor in photosynthesis - a process vital for life on earth.

Average cloud cover varies throughout the year. The months June to November maintain the highest average range.

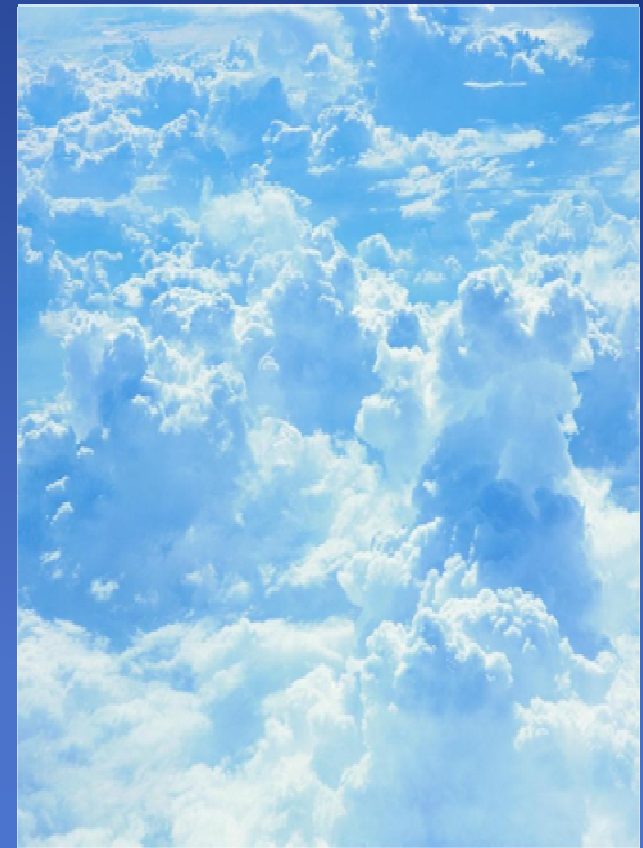


Fig. 6. Clouds



# Tropical Cyclone

A rotating low pressure system with thunderstorms that produce strong winds, heavy rainfall, storm surge and may also cause small funnel clouds.



Fig. 6. Funnel cloud-Biabou

They rotate anti-clockwise in Northern hemisphere.

E.T.Joshua Airport-Arnos Vale



Fig. 7. Structure of cyclone

# Cyclones

Classified as- Depressions, storms and hurricanes

The eye is a region of mostly calm weather found at the center of the cyclone. However, the violent winds in the opposite eye-wall can catch you by surprise.

The eye-wall surrounds the eye with a ring of towering thunderstorms where the most severe weather occurs.

# TERMS- WHAT TO DO?

Watch- Be prepared, do reinforcements store supplies, listen to the radio.

Warning- Finish preparations, listen to official bulletins, stay indoors and away from flood waters.

After-Keep listening to radio/TV stations for official instructions. Listen for the “all-clear”

Assess your damage

# Causes of Flooding

## Natural Causes

- Excessive rainfall
- Overflow of water courses

## Human Causes

- Agricultural practices
- Inadequate infrastructure
- Deforestation
- Urban increase
- Improper disposal of garbage



Fig. 8. Flood damage in Georgetown April 12<sup>th</sup>, 2011



Fig. 9. Storm surge at Cruise Ship Berth- Kingstown

# Hurricane Forecast 2011

**Arlene**

**Bret**

**Cindy**

**Don**

**Emily**

**Franklin**

**Gert**

**Harvey**

**Irene**

**Jose**

**Katia**

**Lee**

**Maria**

**Nate**

**Opheli**

**Philippe**

**Rina**

**Sean**

**Tammy**

**Vince**

**Whitney**

Atlantic and Caribbean  
hurricane season:  
June 1 to November 30  
with peak season mid-  
August to late October.

	Named storms	Hurricane potential	Major hurricane potential
2011	12-18	6-10	3-6
Average	9-11	6	2

# WHAT IS AVAILABLE

## Daily

- ✓ Weather observations and reports
- ✓ Weather, marine and winds forecast

## WEEKLY

- ✓ Tropical summary

## Monthly

- ✓ Standardised Precipitation Index (SPI) and deciles for drought / precipitation indices

## Seasonal

- ✓ Precipitation outlook with SPI index prepared by CIMH.
- ✓ Midyear bulletin prepared by the E.T. Joshua Airport Meteorological Office



Thank you!

*Joan Mc Donald*