

# **METEOROLOGICAL SERVICES, MBIA**

***Hurricane Season 2017: Bret and wet days***

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***GRENADA***



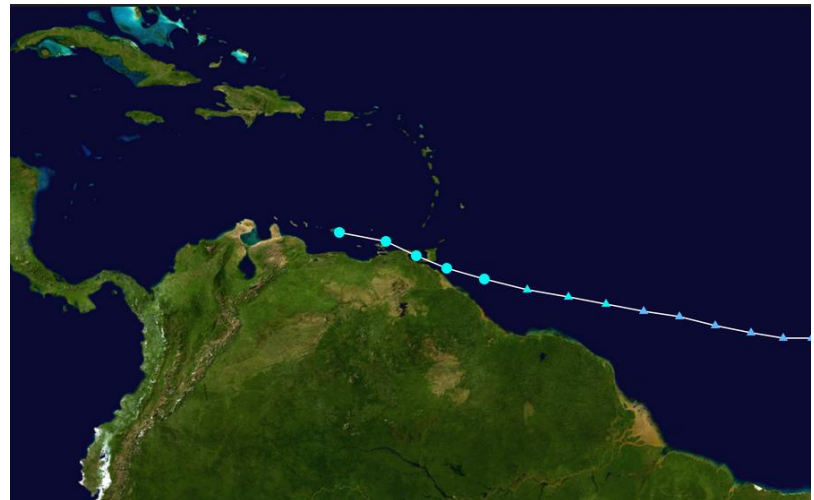
# Bret – a familiar name

- *August, 1993* brought Tropical Storm Bret to the southern Caribbean
- *June, 2017* brought another Tropical Storm Bret to the southern Caribbean

1993 track



2017 track



# Meteorological History- TS Bret

On June 12, the NHC analyzed a Tropical wave just offshore the western coast of Africa, with scattered shower and thunderstorm activity mainly embedded in the monsoon trough to its south. This system was introduced as a potential contender for development while located well south of Cabo Verde two days later, though any organization was expected to be slow as the wave tracked swiftly westward. On June 16, cloudiness associated with the feature began to show signs of organization, and this trend continued into June 18, prompting the NHC to issue their first-ever advisory on a *potential tropical cyclone*

Despite winds of tropical storm-force, it was inconclusive whether the system possessed a closed low-level circulation.

# Potential Tropical Cyclone #2

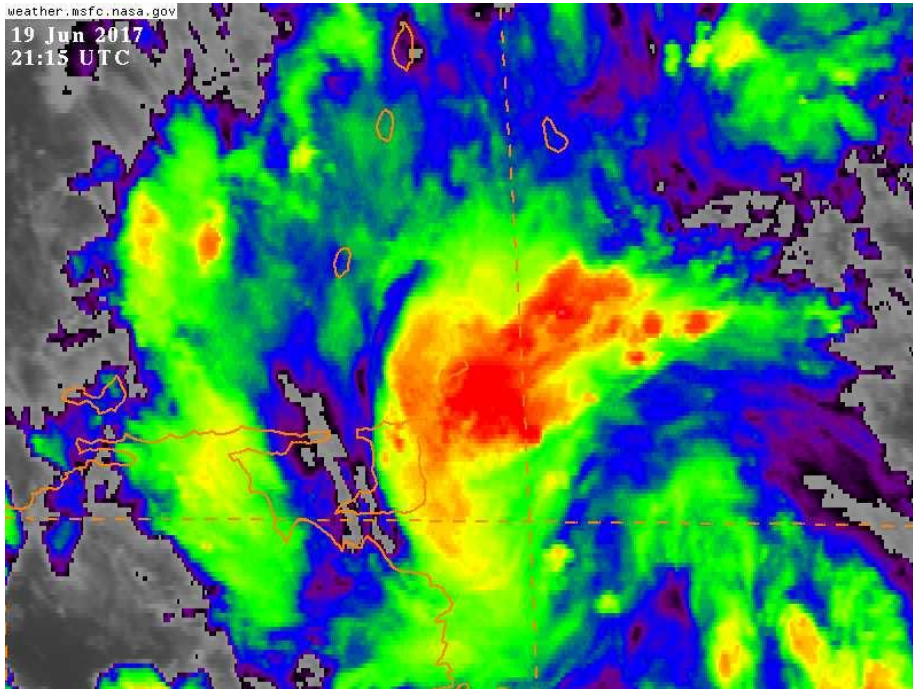
- At 5:00 a.m. (June 19<sup>th</sup>), **Potential Tropical Cyclone #2** was located approximately **550 miles** East South-East of Grenada.
- The disturbance was centered near latitude 8.4 North, longitude 54.5 West. The system was moving toward the west near 23 mph and was expected to move toward the west-northwest over the next 48 hours. Maximum sustained winds were near 40 mph with higher gusts. The central pressure was 1005 millibars. Some strengthening was forecast during the next 48 hours, and the disturbance was expected to be a tropical storm when it moved through Windward Islands Monday night and Tuesday. Showers and thunderstorm activity associated with the disturbance continued to organize.

**This system had a high chance, (90%), of becoming a tropical cyclone within the next two (2) to five (5) days.**

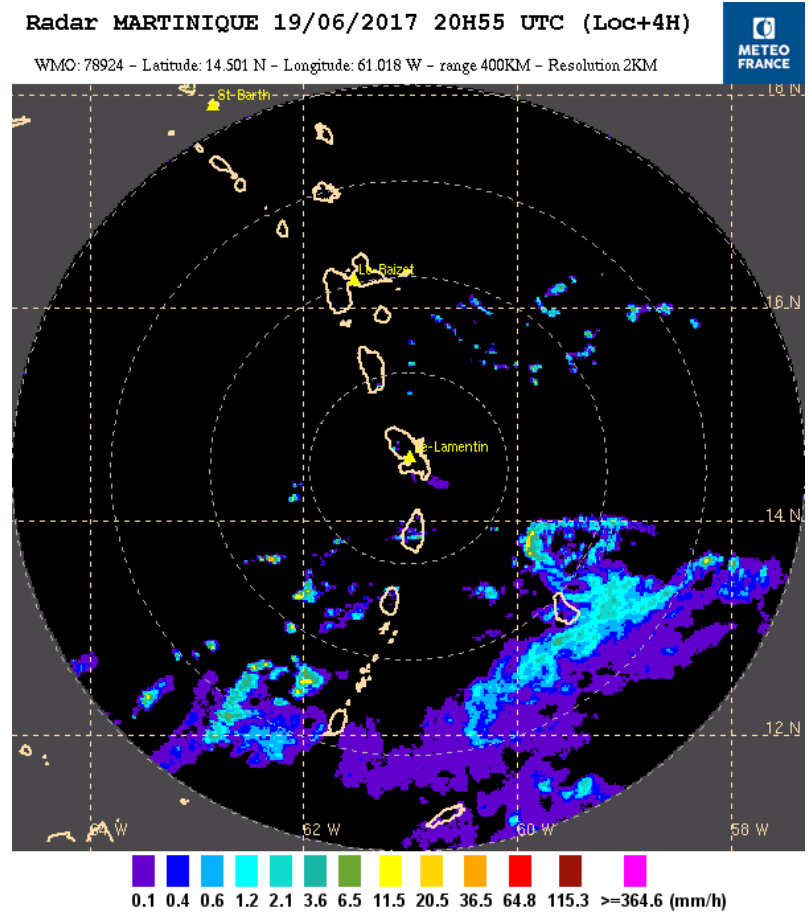
# Tropical Storm Bret

- **At 5:00 pm (June, 19<sup>th</sup>)... A reconnaissance aircraft investigating the storm was indeed able to find a closed low, and the NHC named the disturbance Tropical Storm Bret as a result.**
- Location: 9.4N 59.8W about 225 miles SE of Grenada
  - Maximum Sustained Winds: 40 mph
  - Present movement: WNW at 30 mph
  - Minimum Central Pressure: 1007 millibars
- **Grenada was placed under Tropical storm Warning.**

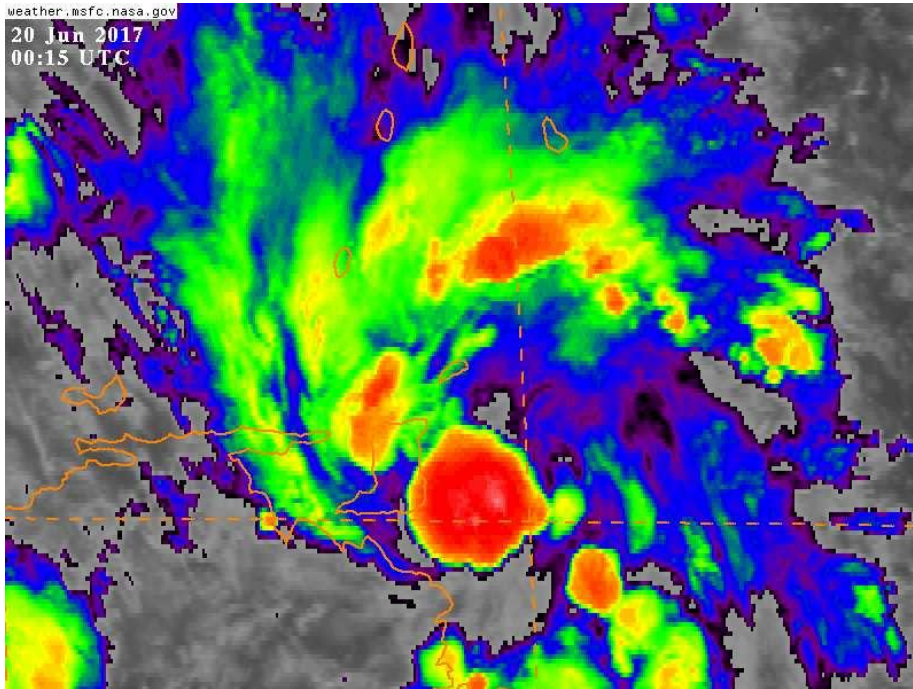
# Tropical Storm Bret



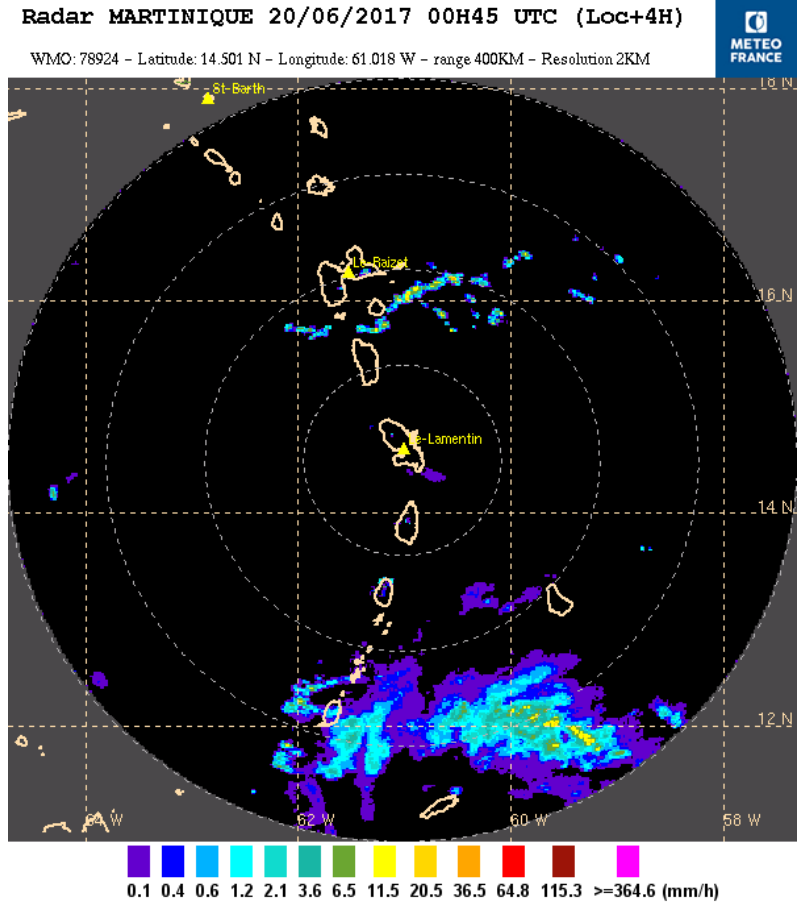
Not well-defined but convection and area of precipitation are significant enough to cause concern.



# Tropical Storm Bret



Better organized with moderate to heavy precipitation becoming more prominent





# Tropical Storm Bret

- **Observations at MBIA (18Z, 19<sup>th</sup> to 18Z, 20<sup>th</sup>)**
  - Precipitation: Showers (light to heavy) initially; followed by 17 hours of continuous rain (light to heavy).
  - June, 2017 was the wettest June on record at MBIA (since 1985)
  - Wind: Gusting up to 50 knots
  - Cloudy conditions
  - The following rainfall values were recorded at MBIA in June, 2017 (passage of TS Bret):
    - 8:00 am, 18th - 8:00 am, 19th = 28.7 mm
    - 8:00 am, 19th - 8:00 am, 20th = 18.0 mm
    - 8:00 am, 20th - 8:00 am, 21st = 50.4 mm

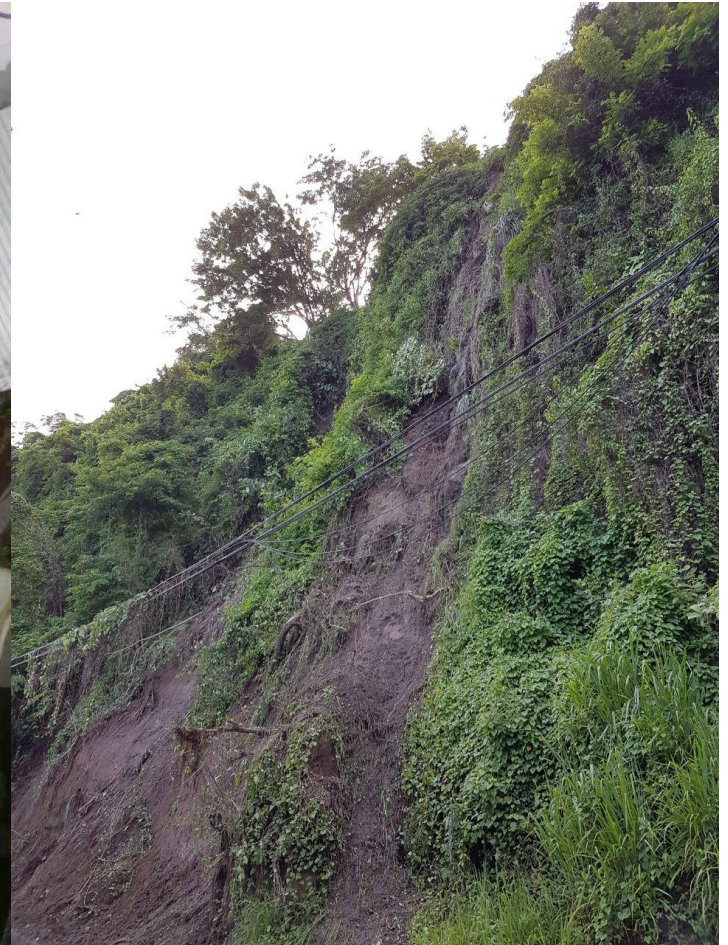
# Tropical Storm Bret

- **Otherwise in the Tri-Island state**
  - Cloudy to overcast conditions with continuous precipitation resulted in flooding and landslides.

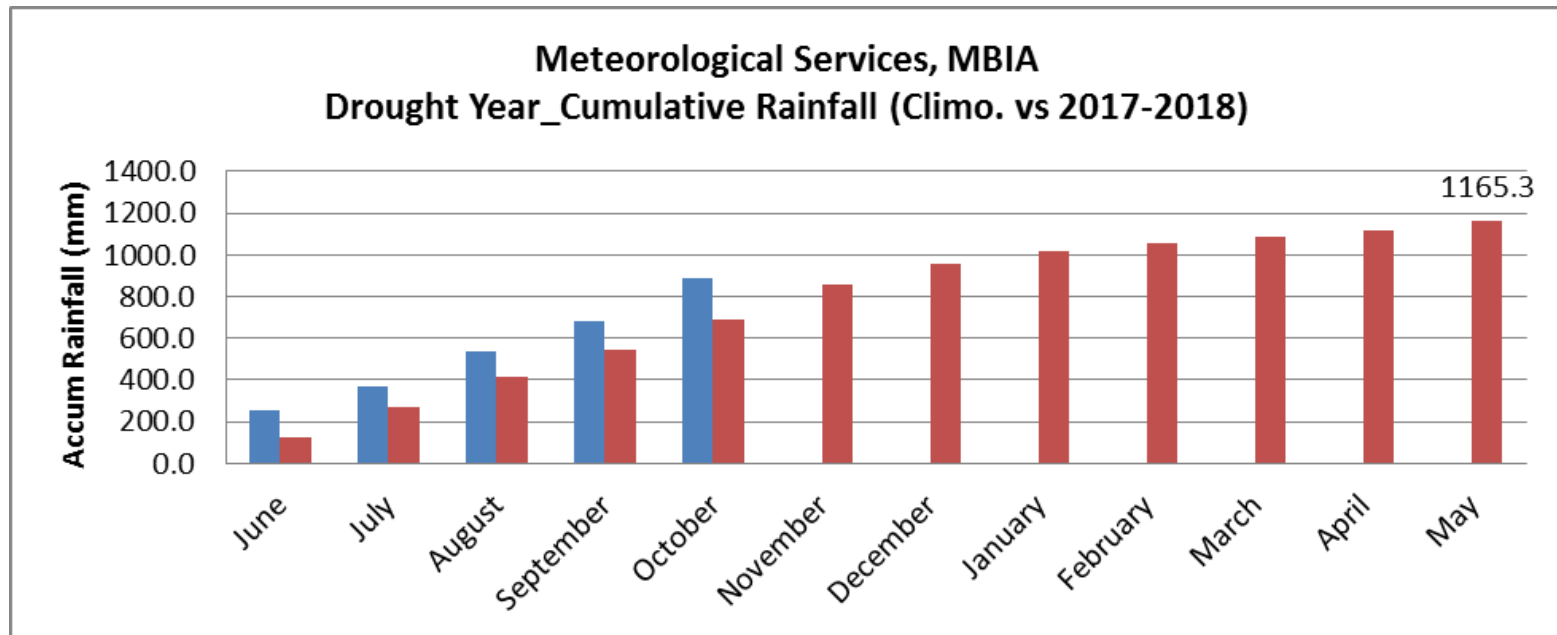


# Tropical Storm Bret

Wind damage  
and  
Landslide

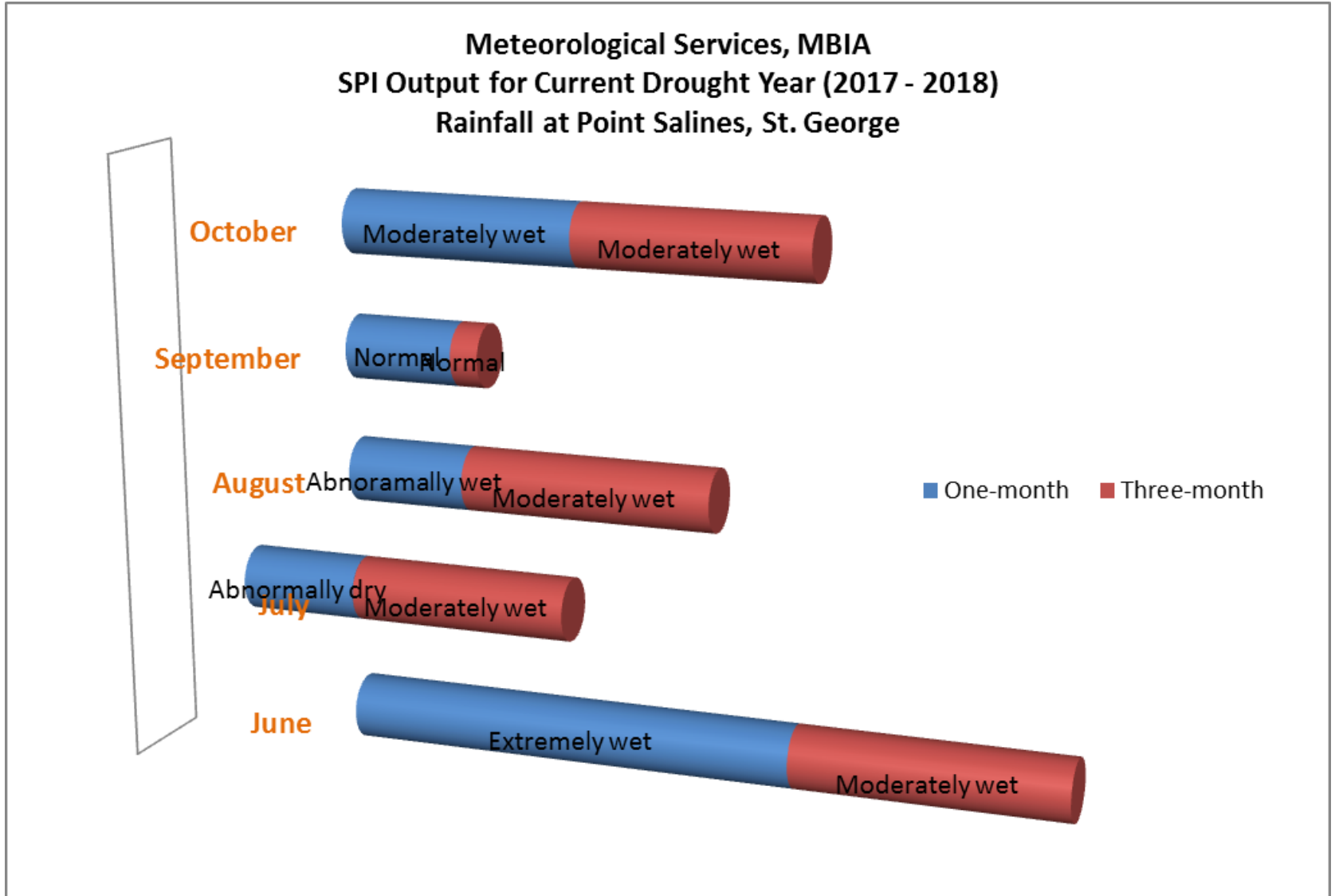


# “Wet since Bret”



Blue: 2017 (thus far) vs Red: Climatology. Drought is “No Concern” (thus far)!

# Meteorological Services, MBIA\_SPI



# Flooding & Landslide

- **From Tropical Storm Bret to now**
  - 10 flooding and/or landslide events have been reported across the state of Grenada.
  - October, 2017 brought a week-long rainfall event as an abundance of deep-layered moisture lingered across the southern Caribbean. The propagation of a tropical wave along with the northward oscillation of the ITCZ within that period only added the precipitation.

# Pictures-Flooding & Landslide

Complete  
and  
partial  
road  
blockage



# Pictures-Flooding & Landslide

Flooding in Gouyave.  
The towns of Gouyave and Victoria flooded out while sunny conditions dominated elsewhere.





# Learning From The Past

Floods & Landslides

## Meteorological Services, MBI\_A\_Floods & Landslides

No.	Date (yy mm)	Wind field	Veering/Back	Vorticity	Pressure Ten	Low-level con	Upper-level di	Moisture
11	14.11.13	NA	NA	Mid-level trou	0.1	NA	NA	Moist low
12	15.09.09	E'ly; Shear: u	NA	Upper-level tr		Yes (5+)	Yes (5+)	RH 70+%
13	15.09.10	NA	NA	Tropical wave	0.7	NA	NA	RH 70+%
14	15.09.13	Shear: 10 - 2	NA	Ridging	0.3	Yes (5+)	Yes (5+ incre	Deep-lay
15	15.11.05	NA	NA	Deep-layered	0.1	Yes (5-10)	Yes (20+)	Surge in
16	15.11.08	Shear: 40+kt	NA	Trough (wave)	-0.2	Yes (5+)	Yes (5+)	Deep-lay
17	15.12.18	NA	NA	NA	1.1	NA	NA	NA
18	16.06.06	S'ly aloft	Veering	Ridge	NA	NA	NA	RH 50+%
19	16.07.14	NA	NA	NA	NA	Yes	Yes	NA
20	16.11.02	SSE'ly to SW	Veering	NA	1.1	NA	Yes	Deep-lay
21	16.11.09	SE'ly to S'ly	Veering	Sfc to mid-le	-0.4	NA	Yes (~5 & IN	RH: 50+
22	16.11.29	SE'ly to W'ly	Veering	Low to mid-le	1.0	Yes (5 - 10 v	Yes (5 - 10 w	NE-SW

No.	Wind field	Veering/Backing	Vorticity field
8	NA	NA	Low to mid-level trough
Pressure tendency	Low-level Convergence	Upper-level Divergence	Moisture field
-0.2	NA	Yes (5+ in the AM)	Moist low to mid-level
Synoptic feature	Flood location	Landslide location	Rainfall amount
Cloudy w/ upper-level su	No flooding reported	St. George (Grand Etang	MBIA: 30.0mm

Warning Stats

Total Entries 37

Veering 15

Trough 22

Orog lift 4

Moist Adv 9

LL Conv 18

UL Div 22

ITCZ 5

Most Fd Locn St. George

Most Ls Locn St. Mark

Quick tips

GoTo MM

GoTo PAME

Dewetra MAPS

Near Event

A user form has been developed to document all floods & landslides along with synoptic analyses & images. The aim is to provide some stats that can aid in the forecasting of events.



## From Here On

- Given the recent weather events and continuous threat of future events, it is important that the organization enhances its products and services.
  - Hence, the aim is to evolve from mere Weather Forecast and Warning to Multi-hazard Impact-based Forecasts and Warning.

**THANK YOU VERY  
MUCH**