Covered Area Rainfall Event (29/10/2020 to 03/11/2020)

Excess Rainfall

Event Briefing

Saint Lucia

12 November 2020

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1 INTRODUCTION

Saint Lucia was under the influence of two tropical waves resulting in adverse weather conditions that occurred primarily between October 28 and November 1, 2020. During this period, Saint Lucia was affected by periods of rainfall and thunderstorm activity.

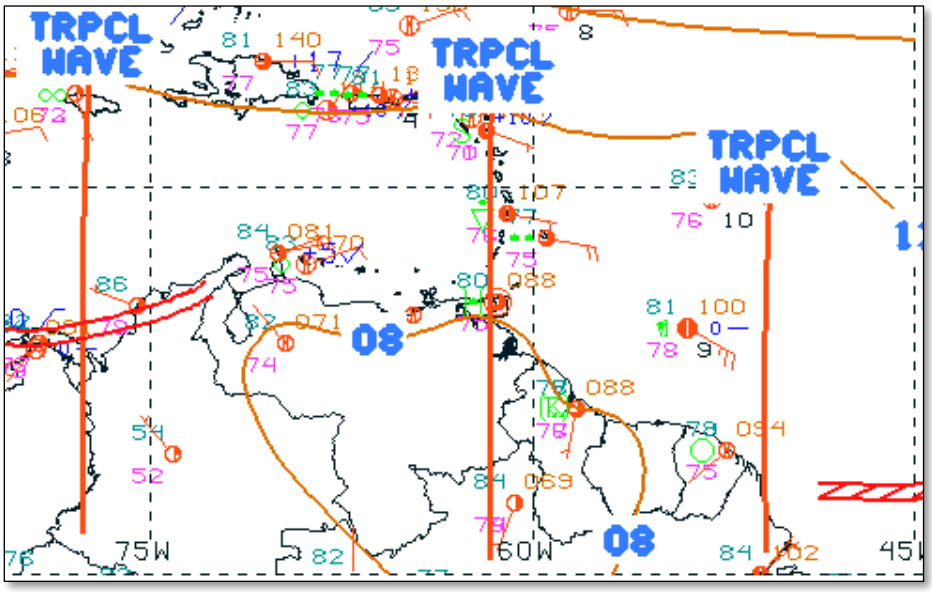
This event briefing describes the impact of rainfall on Saint Lucia, which was associated with a Covered Area Rainfall Event (CARE), starting on 29 October and ending on 3 November 2020. The Rainfall Index Loss (RIL) was below the attachment point of the Excess Rainfall policy for Saint Lucia and therefore no payout is due to the Government of Saint Lucia.

2 EVENT DESCRIPTION

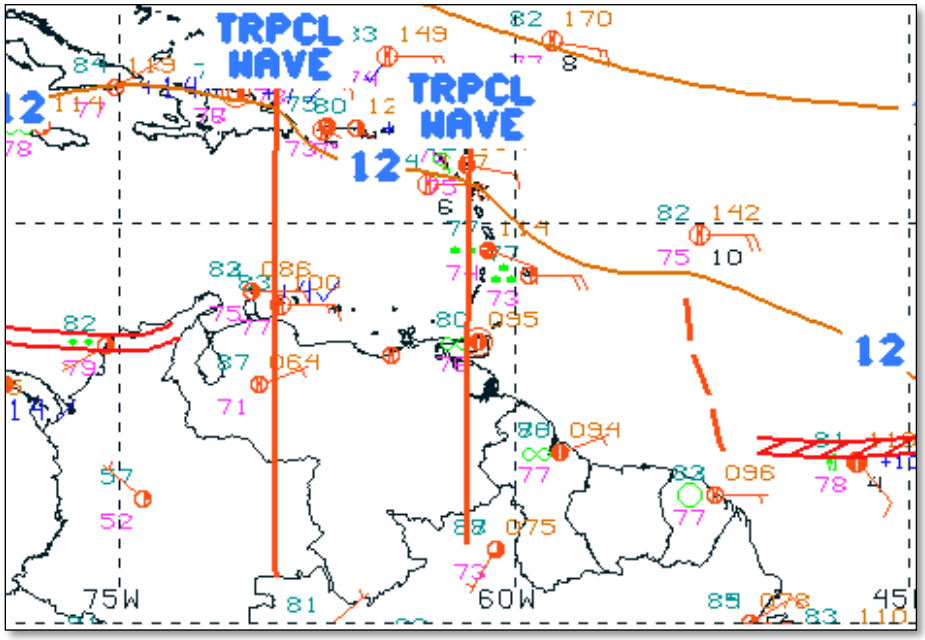
On 29 and 30 October, two tropical waves moved consecutively in a westward direction over the Lesser Antilles. The first and weaker one passed over the Windward Islands between 28 October at 1800UTC and 29 October at 0000UTC (Figure 1a). It produced scattered moderate to locally intense shower activity over the Windward Islands and the surrounding waters. Over Saint Lucia, it yielded moderate precipitation on 28 October from 1300UTC to 1800UTC. The second and stronger tropical wave moved over the Lesser Antilles between 29 October at 1800UTC and 30 October at 0000UTC (Figure 1b). The second tropical wave further developed two days later (on 1 November) into Tropical Cyclone Eta, at that time the most powerful tropical cyclone of the Atlantic Hurricane Season 2020Due to the impact of the second tropical wave on the Lesser Antilles, strong convection was reported over the Windward Islands and the surrounding waters between 29 and 30 October. Over Saint Lucia, a thunderstorm was active from 29 October at 1900UTC to 30 October at 0700UTC (Figure 2a), while a second thunderstorm associated with the instability left after the tropical wave passage was active on 30 October between 1700UTC and 2200UTC.

In the following two days, on 31 October and on 1 November, the large availability of moisture at the upper level and the residual instability left after the passage of the two tropical waves favoured the development of scattered moderate to locally intense showers and thunderstorms over the Windward Islands. Saint Lucia was intermittently affected by moderate to intense precipitation. In particular, shower activity was visible from satellites on 31 October between 0900UTC and 1900UTC and on 1 November between 0900UTC and 2000UTC (Figure 2b).

On 2 and 3 November, anticyclonic conditions prevailed over the Windward Islands and consequently the thunderstorm activity ceased.



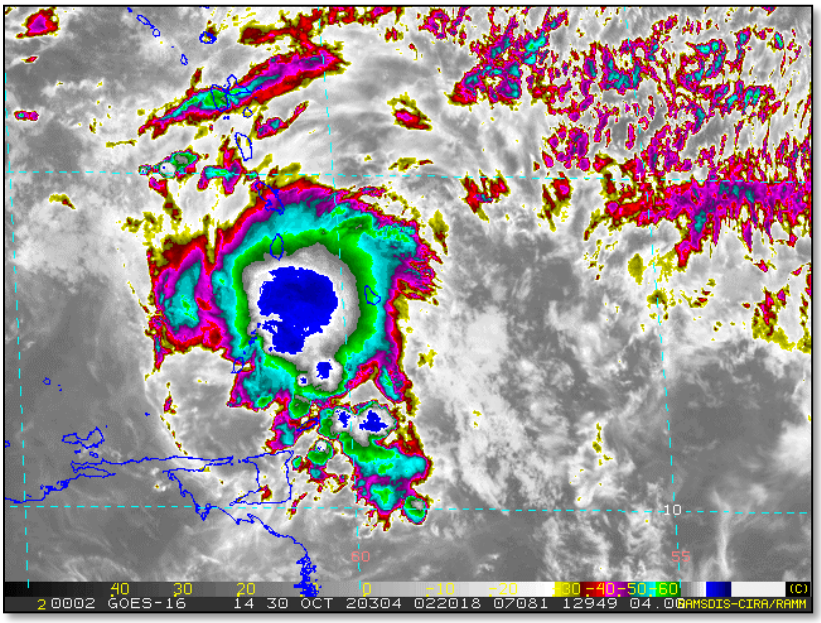
a) 29 October at 0000UTC



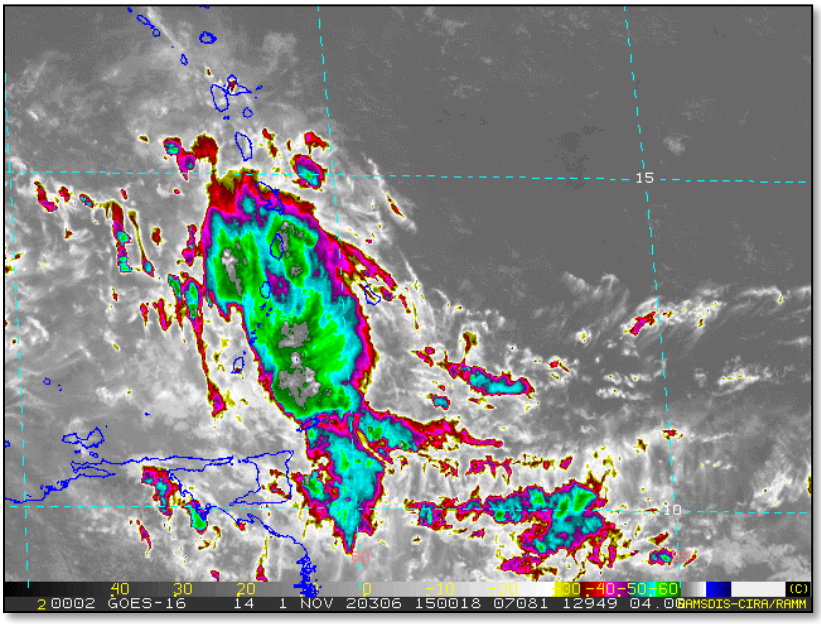
b) 30 October at 0000UTC

Figure 1 Surface analysis over Caribbean Sea at different times as reported in the labels.
Source: US National Hurricane Center[1]

[1] National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review dates: 29-30 October 2020, available at: *https://www.nhc.noaa.gov/tafb/CAR_00Z.gif*



a) 30 October at 1440UTC



b) 1 November at 1500UTC

Figure 2 Satellite imagery at different times as indicated in the label from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between -50°C and -70°C), while the red/yellow colours represent very high altitude clouds (top cloud lower than -70°C). High altitude clouds indicate strong convection associated with intense precipitation.
Source: Source: NOAA Satellite and Information Service[2]

[2] RAMSDIS Online Archive, NOAA Satellite and Information Service, review dates: 30 October – 1 November 2020, available at:

3 IMPACTS

At the time of this report and according to an assessment update provided by Saint Lucia's National Emergency Management Organisation[3] there was minor surface water flooding and landslides in various areas on the island. Castries and parts of Laborie, Vieux Fort, Dennery and Gros Islet recorded flooding. Landslides were reported in Louvette, Upper Aux Lyons and Dennery, with the most significant one occurring in Dennery.

Prior to the arrival of the tropical waves, Saint Lucia's authorities took precautionary measures such as activating a Flood Warning. According to reports from the Saint Lucia Meteorological Services, the development and evolution of the tropical waves and weather conditions were closely monitored.

4 RAINFALL MODEL OUTPUTS

All three data sources used by the XSR 2.5 model, CMORPH[4], WRF5 and WRF7[5], detected the occurrence of precipitation over Saint Lucia and the surrounding waters during the period 29 October – 03 November 2020. However, each data source reported a specific distribution and accumulation of rainfall, as discussed below.

CMORPH reported total accumulated amounts of precipitation between 150 mm and 180 mm over most of Saint Lucia and values in the range 120 mm – 150 mm over the central eastern portion of the country, in particular in the Micoud District (Figure 3a).

WRF5 presented total accumulated amounts of rainfall with values higher than 60 mm over the majority of Saint Lucia, with the largest values over the eastern portion. The maximum values (between 180 mm and 210 mm) were reported along the eastern coast (see Figure 3b).

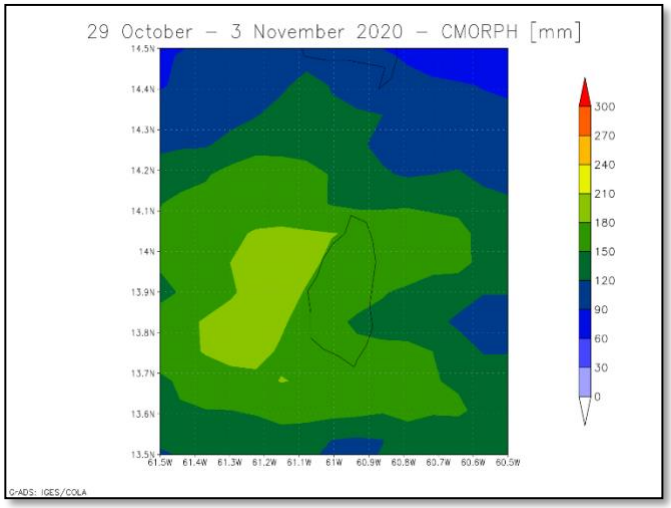
WRF7 showed total accumulated precipitation values larger than 30 mm over the eastern portion of Saint Lucia, with a peak between 150 mm and 180 mm along the southeast coast. Values lower than 30 mm were simulated over the remaining territory of the country (see Figure 3c).

http://rammb.cira.colostate.edu/ramsdis/online/archive.asp?data_folder=tropical/tropical_ge_14km_wv&width=640&height=480

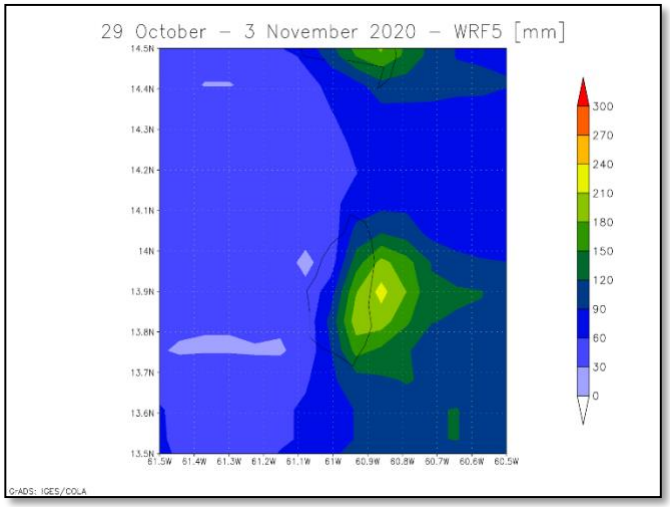
[3] News Articles, Notices for General public –Government of Saint Lucia, 'NEMO speaks on disaster mitigation efforts' (As if 3 November 2020), review date: 12 November 2020, available at: *http://www.govt.lc/news/for/general-public*

[4] CMORPH Model: the satellite-based rainfall precipitation estimates provided by the NOAA Climate Prediction Center (CPC) using the so-called Morphing Technique *http://www.cpc.ncep.noaa.gov/products/janowiak/cmorph_description.html*. Further details in the Definitions section of this report.

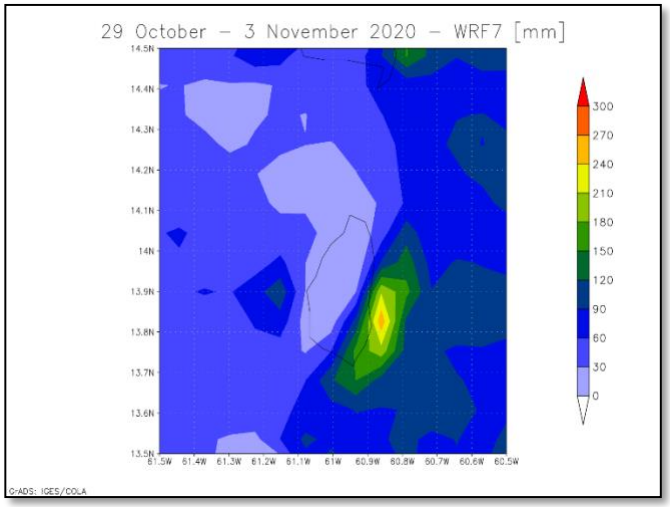
[5] WRF5 and WRF7 Models: the Weather Research and Forecasting Model weather model-based Configuration #1 and #2 data *https://www.mmm.ucar.edu/weather-research-and-forecasting-model*. These data are initialised by the NCEP FNL dataset. (NCEP FNL Operational Model Global Tropospheric Analyses [*http://rda.ucar.edu/datasets/ds083.2/*]). Further details in the Definitions section of this report.



a) CMORPH



b) WRF5



c) WRF7

Figure 4 Total accumulated precipitation during the period October 29 – November 1, 2020 estimated by CMORPH (a), WRF5 (b) and WRF7 (c). Source: CCRIF SPC

Daily rainfall maps by CMORPH, WRF5 and WRF7 over the exposure map of XSR 2.5 are not included here and they can be downloaded at the following links for 12-hour aggregation and 48-hour aggregation respectively:

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/LCA/CARE_3_2020/daily_prec_short.mp4

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/LCA/CARE_3_2020/daily_prec_long.mp4

The Rainfall Index Loss (RIL) was above the loss threshold for Saint Lucia for two of the data sources used by XSR2.5: CMORPH and WRF5. The RIL was higher for CMORPH due to the larger amount of accumulated precipitation presented over the northwestern portion of the country, the area characterized by the highest exposure for Saint Lucia.

The final RIL (RIL_{FINAL}) was calculated as the average of the RILs for the CMORPH and WRF5 data sources. The RIL_{FINAL} was greater than zero and therefore this CARE qualified as a loss event. However, the RIL was below the attachment point of the Excess Rainfall policy for Saint Lucia and thus did not trigger a policy payout.

5 TRIGGER POTENTIAL

The Rainfall Index Loss calculated for this Covered Area Rainfall Event was below the attachment point of the Excess Rainfall policy for Saint Lucia and therefore no payout is due.

For additional information, please contact CCRIF SPC at: pr@ccrif.org

DEFINITIONS

Active Exposure Cell Percentage Threshold	The percentage of the total number of XSR Exposure Grid Cells within the Covered Area of the Insured, that must be exceeded to trigger a Covered Area Rainfall Event.
Active Exposure Grid Cells	The XSR Exposure Grid Cells for which in the same single day the Aggregate Rainfall #1 value computed using the CMORPH-based Rainfall Estimate equals or exceeds the Rainfall Event Threshold #1 or the Aggregate Rainfall #2 value computed using the CMORPH-based Rainfall Estimate equals or exceeds the Rainfall Event Threshold #2.
Aggregate Rainfall #1	The rainfall amount accumulated over the Rainfall Aggregation Period #1 (as defined in the Schedule) measured in millimeters (mm) in any of the XSR Exposure Grid Cells in the Covered Area of the Insured. For a given day and a Rainfall Aggregation Period #1 of n hours, the Aggregate Rainfall #1 is the maximum amount of rainfall accumulated over any of the n-hour windows that intersect the day itself considering a time interval of 3 hours.
Aggregate Rainfall #2	The rainfall amount accumulated over the Rainfall Aggregation Period #2 (as defined in the Schedule) measured in millimeters (mm) in any of the XSR Exposure Grid Cells in the Covered Area of the Insured. For a given day and a Rainfall Aggregation Period #2 of n hours, the Aggregate Rainfall #2 is the maximum amount of rainfall accumulated over any of the n-hour windows that intersect the day itself considering a time interval of 3 hours.
Calculation Agent	Entity charged with undertaking the primary calculation of the Rainfall Index Loss.
CMORPH-based Maximum Aggregate Rainfall #1	The maximum value during the Covered Area Rainfall Event of the Aggregate Rainfall #1 computed using the CMORPH-based Rainfall Estimates in any given XSR Exposure Grid Cell over the Covered Area of the Insured.
CMORPH-based Maximum Aggregate Rainfall #2	The maximum value during the Covered Area Rainfall Event of the Aggregate Rainfall #2 computed using the CMORPH-based Rainfall Estimates in any given XSR Exposure Grid Cell over the Covered Area of the Insured.
CMORPH-based Covered Area Rainfall Parameters	The CMORPH Model information provided on a continuous basis by the XSR Model Data Reporting Agency used by the Calculation Agent to obtain the CMORPH-based Rainfall

	Estimates using the XSR Rainfall Model. Parameters are drawn from XSR Exposure Grid Cells within the Covered Area of the Insured, by their respective latitude and longitude. Measurement units and precision of data ingested by the XSR Rainfall Model are identical to those provided by the XSR Model Data Reporting Agency and are further elaborated in the Attachment entitled 'Calculation of Rainfall Index Loss and Policy Payment'.
CMORPH Model	The satellite-based rainfall estimation model provided by NOAA CPC as described in the Rainfall Estimation Models section of the Policy.
Covered Area	The territory of the Insured as represented in the XSR Rainfall Model.
Covered Area Rainfall Event	Any period of days, with an interruption less than or equals to the Event Tolerance Period, during which the number of Active Exposure Grid Cells is greater than or equal to the product of (a) Active Exposure Cell Percentage Threshold multiplied by (b) the total number of XSR Exposure Grid Cells within the Covered Area.
Country Disaster Alert	An official disaster alert issued by ReliefWeb (*http://reliefweb.int/*) for the country in question for one of the following types of events: tropical cyclone, flood, flash flood and severe local storm. Any disaster alert issued later than seven (7) days after the completion of the Covered Area Rainfall Event (CARE) event will not be considered. The Disaster Alert description issued by ReliefWeb and/or its attached documentation must include specific reference to the CARE dates with a tolerance period of 2 calendar days.
Maximum Aggregate Rainfall #1	The highest value during a Covered Area Rainfall Event of the Aggregate Rainfall #1 amount in any of the XSR Exposure Grid Cells in the Covered Area of the Insured computed.
Maximum Aggregate Rainfall #2	The highest value during a Covered Area Rainfall Event of the Aggregate Rainfall #2 amount in any of the XSR Exposure Grid Cells in the Covered Area of the Insured computed.
Rainfall Event Threshold #1	Aggregate Rainfall #1 level as defined in the Schedule which should be exceeded to trigger an Active Exposure Cell.
Rainfall Event Threshold #2	Aggregate Rainfall #2 level as defined in the Schedule which should be exceeded to trigger an Active Exposure Cell.

Rainfall Aggregation Period #1	The number of hours over which the Aggregate Rainfall #1 is computed for all XSR Exposure Grid Cells during a Covered Area Rainfall Event.
Rainfall Aggregation Period #2	The number of hours over which the Aggregate Rainfall #2 is computed for all XSR Exposure Grid Cells during a Covered Area Rainfall Event.
Rainfall Index Loss	For any Covered Area Rainfall Event affecting the Insured, the US Dollar loss calculated by the Calculation Agent using the XSR Rainfall Model, as described in the Attachment entitled 'Calculation of Rainfall Index Loss and Policy Payment'. The Rainfall Index Loss can only be calculated once the Covered Area Rainfall Event is completed.
WRF5 Model	The weather research and forecasting rainfall model by NOAA with Configuration #5 data initialized with and assimilating the data provided by the National Center for Environmental Prediction as described in the Rainfall Estimation Models and in the Input Data to the Rainfall Estimation Models sections of this Attachment.
WRF7 Model	The weather research and forecasting rainfall model by NOAA with Configuration #7 data initialized with and assimilating the data provided by the National Center for Environmental Prediction as described in the Rainfall Estimation Models and in the Input Data to the Rainfall Estimation Models sections of this Attachment.
XSR Rainfall Model	The computer model used to calculate the Rainfall Index Loss, as described in the Attachment entitled 'Calculation of Rainfall Index Loss and Policy Payment'.
XSR Exposure Grid Cells	The 30 arc-second by 30 arc-second grid of cells each of which is attributed with an XSR Grid Cell Exposure Value greater than zero.
XSR Grid Cell Exposure Value	The value, used to calculate the CMORPH-based Exposure Grid Cell Loss, the WRF5-based Exposure Grid Cell Loss, and the WRF7-based Exposure Grid Cell Loss.