Covered Area Rainfall Event (29/09/2020 to 03/10/2020)

Excess Rainfall

Event Briefing

Dominica

12 October 2020

1   INTRODUCTION

Dominica was under the influence of two tropical waves resulting in adverse weather conditions that occurred between September 29 and October 3, 2020. During this period, parts of Dominica were affected by showers and isolated thunderstorms.

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

2   EVENT DESCRIPTION

On 29 September at 1200UTC, a tropical wave travelled over the Leeward Islands. At this time, its axis was located along 60W from 4N to 20N (Figure 1a) and it was moving west at 11-17 mph (18-28 km/h). The combination of the instability created by the tropical wave and the presence of humid air over the Leeward Islands and the surrounding areas led to the development of scattered moderate to strong showers active from 14N to 19N between 53W and 62W. In particular, the associated precipitation affected Dominica mainly between 1000UTC and 1400UTC (Figure 2a).

On 30 September, the remaining instability left after the passage of the tropical wave favoured the formation of thunderstorms of similar intensity over the same area (from 14N to 19N between 53W and 62W) from 1800UTC to 1 October at 0600UTC (Figure 2b). The convective activity persisted over the region for the remainder of the day, due to the westward transition of a second tropical wave (Figure 1b). At 1200UTC, it was approaching the Leeward Islands, with axis located along 57/58W from 17N southward (Figure 1b) and forward velocity of 11-17 mph (18-28 km/h). Scattered moderate to isolated strong thunderstorms developed over the Leeward Islands and the surrounding waters on 1800UTC and continued the following 24 hours (Figure 2c, 2d).
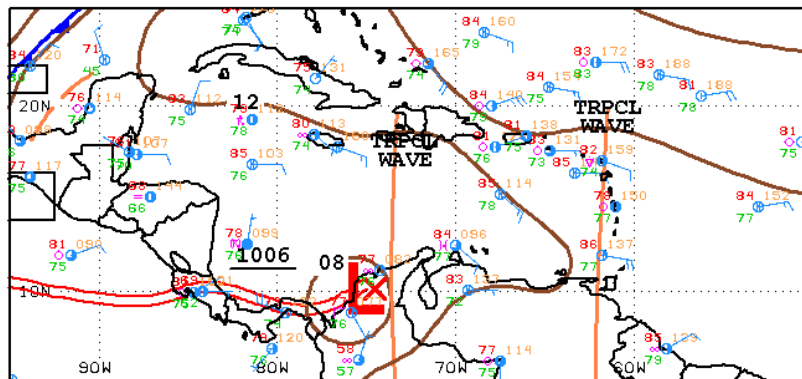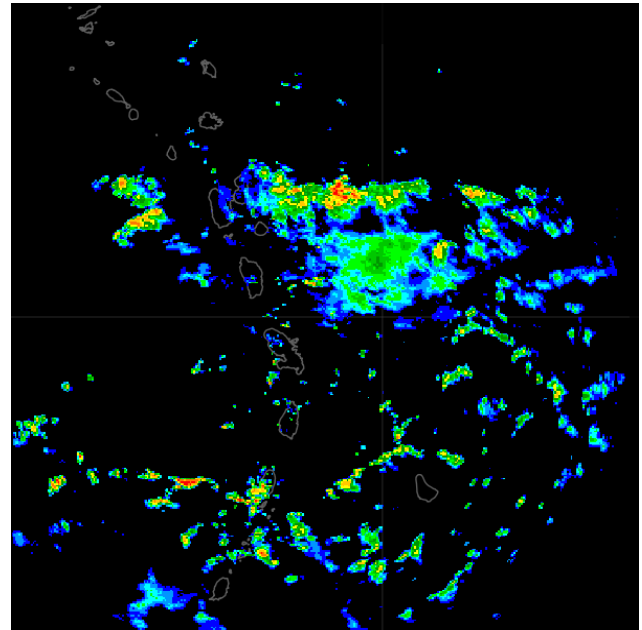

a) 29 September, 2020 at 1200UTC
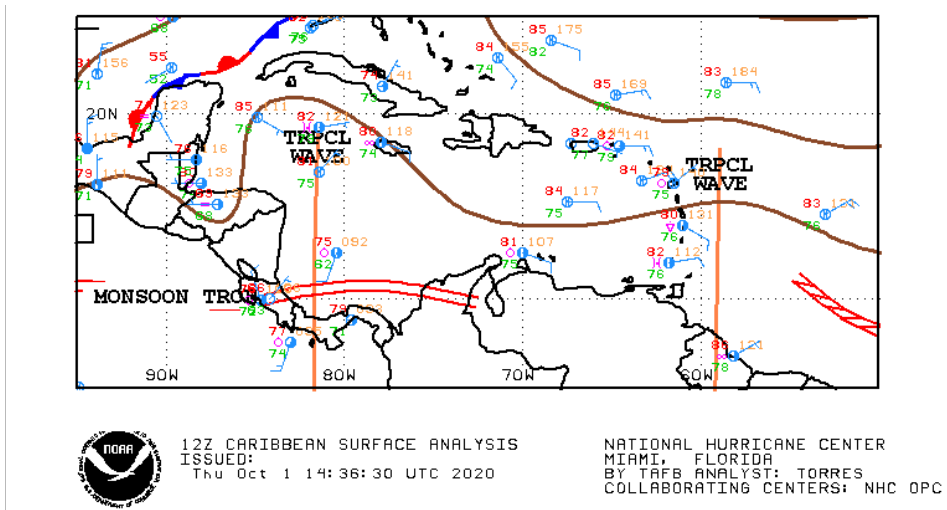
b) 01 October, 2020 at 1200UTC

Figure 1 Surface analysis over the Central America and Caribbean area at different times as indicated by the labels. Source: US National Hurricane Center[1]
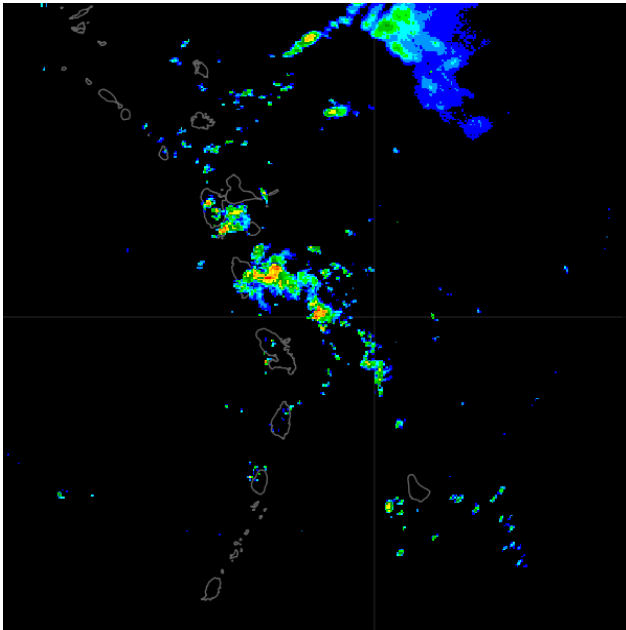
a) 29 September at 1106UTC

b) 30 September at 2106UTC

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[1] National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review date: 29 September and 01 October, 2020, available at: *https://www.nhc.noaa.gov/tafb/CAR_12Z.gif*

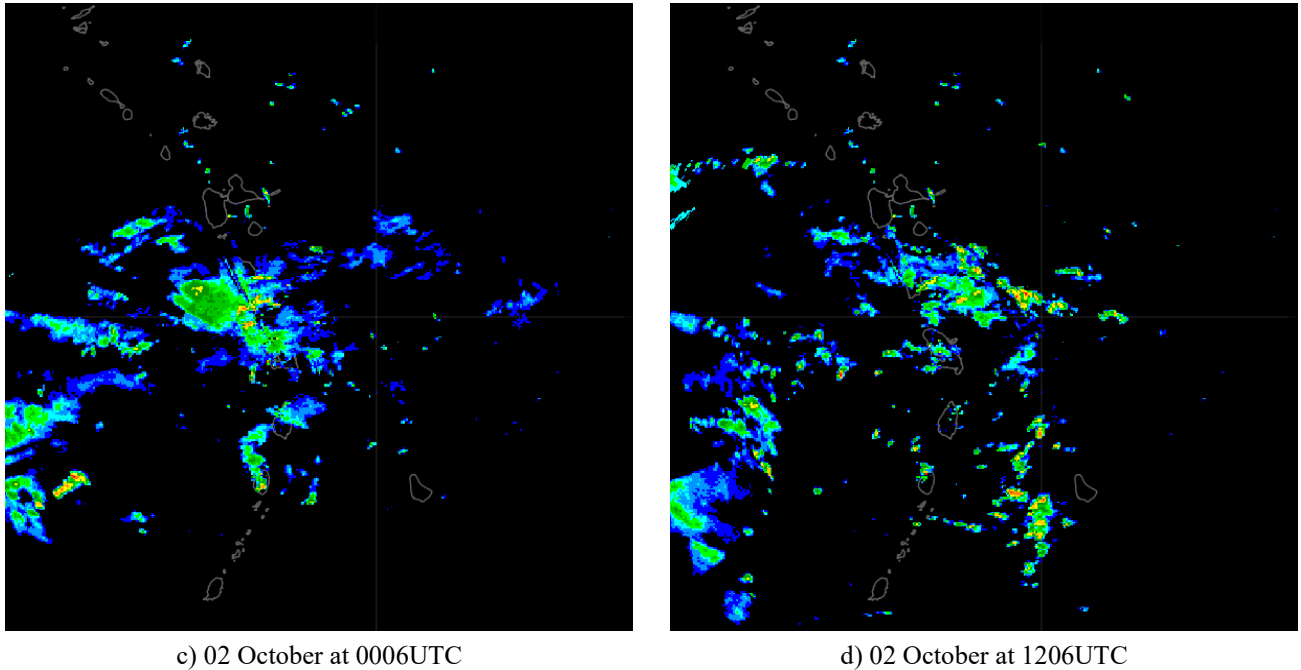| c) 02 October at 0006UTC | d) 02 October at 1206UTC |

Figure 2 Radar reflectivity maps at different times as indicated in the labels. Blue/green colours represent moderate precipitation intensity, while the red/yellow colours represent intense precipitation. Source: Caribbean Radar Composite[2]

3   IMPACTS

At the time of this event brief, no information was available related to damage or loss in Dominica due to this Covered Area Rainfall Event (CARE). According to the reports from the Dominica Meteorological Service, the atmospheric conditions during the period of this CARE were closely monitored. Dominica's authorities took precautionary measures such as activating the Flood Warning and a Small Craft Warning.

4   RAINFALL MODEL OUTPUTS

All three data sources used by the XSR 2.5 model, CMORPH[3], WRF5 and WRF7[4], detected the occurrence of precipitation over Dominica and the surrounding waters during the period

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[2] Caribbean Radar Composite, Barbados Meteorological Services, review dates: 29-30 September, 02 October 2020, available online at: *https://www.barbadosweather.org/BMS_Radar_Composite_Resp.php#*

[3] 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.

[4] 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.

29 September - 03 October 2020. However, each data source reported differing distributions of rainfall, as discussed below.

CMORPH reported total accumulated amounts of precipitation higher than 120 mm over most of Dominica. The largest values of precipitation were shown over the southeastern portion of the island with values between 210 mm and 240 mm and over the western coast with amounts between 180 mm and 210mm.

WRF5 presented total accumulated amounts of rainfall with values between 120 mm and 150 mm over most of Dominica, while values between 90 mm and 120 mm were reported along the west coast and the southern portion of the island.
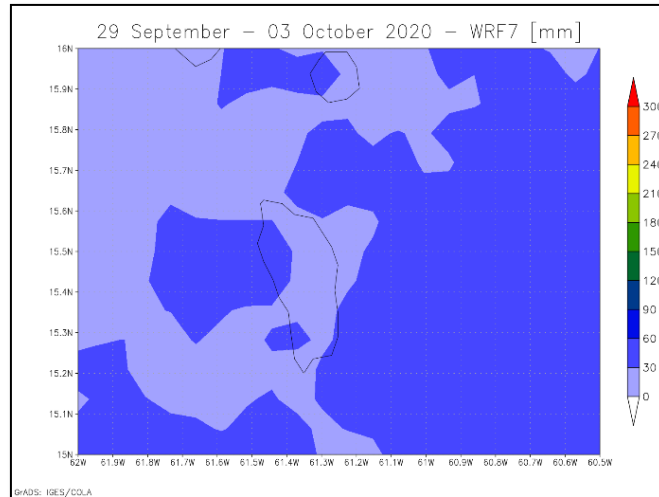
WRF7 showed total accumulated amounts of precipitation between 30 mm and 60 mm over parts of the western coast of Dominica (in particular the parishes of Saint Peter, Saint Joseph and Saint George), while values were lower elsewhere.
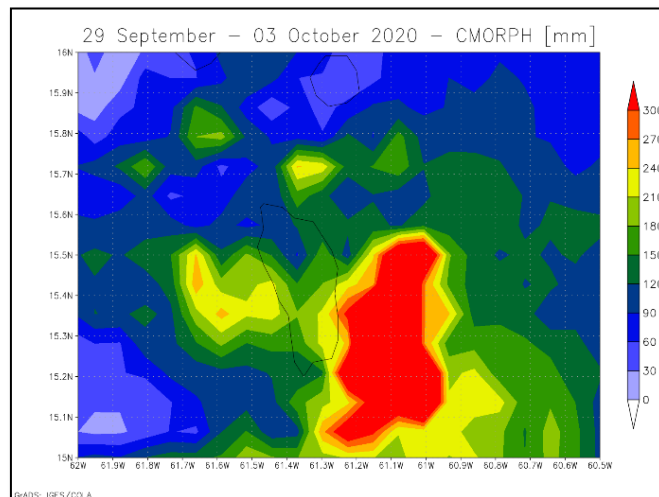
a) CMORPH
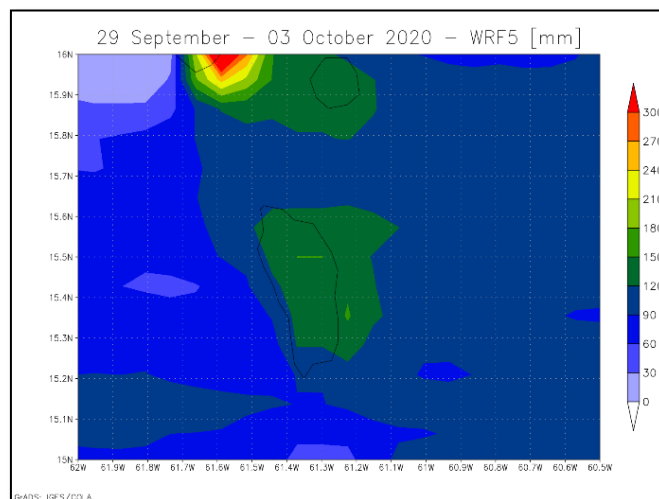
b) WRF5

c) WRF7

Figure 4 Total accumulated precipitation during the period 29 September - 3 October, 2020, over Dominica 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/DMA/CARE_2_2020/daily_prec_short.mp4

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/DMA/CARE_2_2020/daily_prec_long.mp4

The Rainfall Index Loss (RIL) was above the loss threshold for Dominica for two of the data sources used by XSR2.5: CMORPH and WRF5. The RIL was highest for CMORPH due to the higher amounts of accumulated precipitation presented over the island of Dominica, and particularly along the western coast, an area characterized by the largest exposure.

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$_{FINAL}$ was below the attachment point of Dominica's Excess Rainfall policy 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 Dominica's Excess Rainfall policy 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.