



Covered Area Rainfall Event (21/08/2020 to 24/08/2020)

Excess Rainfall

Event Briefing

Nicaragua

2 September 2020

1 INTRODUCTION

Nicaragua was under the influence of low pressure systems on the coast of the Pacific Ocean, namely Tropical Wave Thirty and Tropical Depression Fourteen, resulting in adverse weather conditions that occurred between August 21 and 24, 2020. During this period, Nicaragua was affected by heavy rains.

This event briefing describes the impact of rainfall on Nicaragua, which was associated with a Covered Area Rainfall Event (CARE), starting on 21 August and ending on 24 August 2020. The Rainfall Index Loss (RIL) was below the attachment point of Nicaragua’s Excess Rainfall policy and therefore no payout is due to the Government of the Republic of Nicaragua.

2 EVENT DESCRIPTION

From 21 to 24 August, a monsoon trough persisted over the central countries of Central America and particularly over Nicaragua (Figure 1). During this period, it extended from northern Colombia near 08/10N 74W to the eastern Pacific Ocean, crossing Nicaragua along the latitude 12/14N. This almost stationary configuration led to the development of scattered showers over Nicaragua, mainly between 2000 UTC and 0300UTC (1500 and 2200 local time).

Additionally on 21 and 22 August, stronger and more organized convection activity was observed over western Nicaragua and the surrounding waters due to the combination of the instability caused by the monsoon trough, the westward transition of a tropical wave and the presence of a minimum pressure system offshore the north-west Nicaragua, as shown in Figure 1.

Of significance was the development of a large cluster of thunderstorms between 21 August at 1400UTC and 22 August at 1100UTC (Figure 2), which affected western Nicaragua particularly the area along the Pacific coast with heavy precipitation (Figure 2).

Starting from 25 August, the scattered showers and thunderstorms that were observed in the previous days over Honduras and Nicaragua significantly diminished in number and intensity.

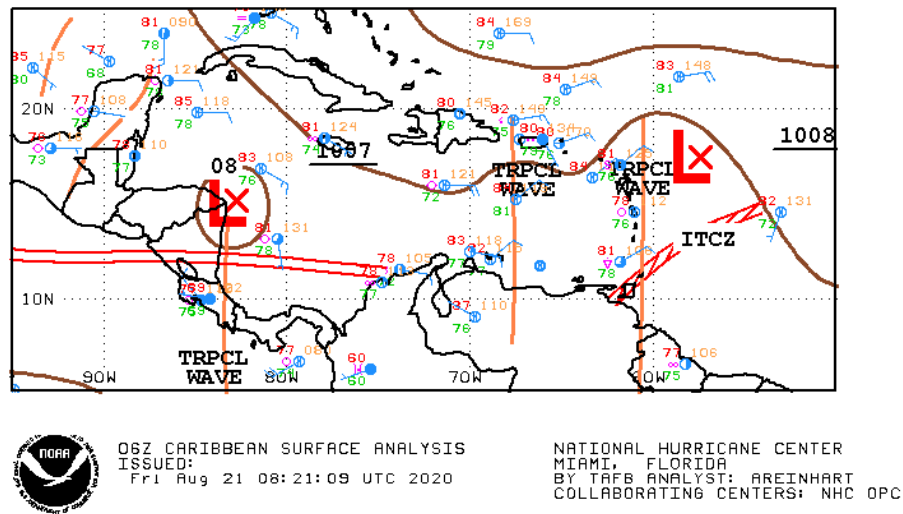


Figure 1 Surface analysis over the Central America and Caribbean area on 21 August at 0600UTC
 Source: US National Hurricane Center¹

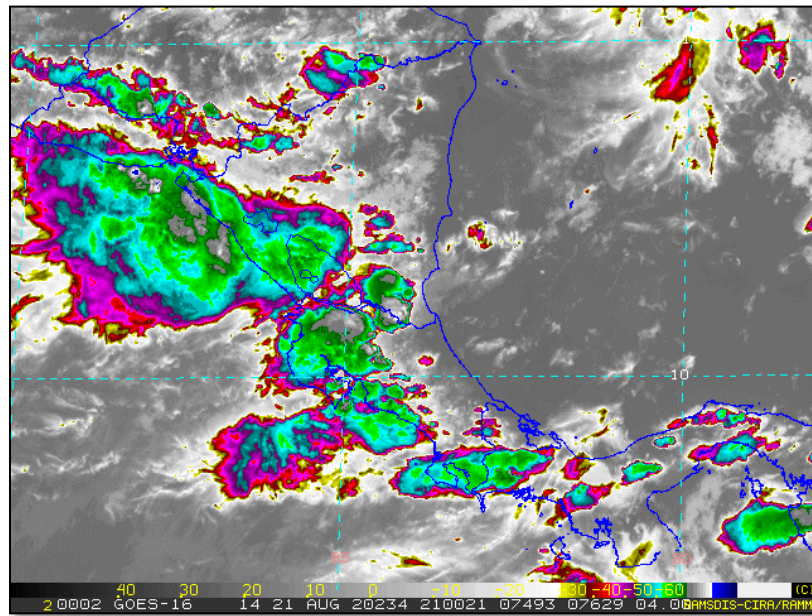


Figure 2 Satellite imagery on 21 August at 2100UTC from thermal infrared channel enhanced with colour. Violet/cyan colours represent high altitude clouds (top cloud temperature between -50°C and -70°C), while the green/grey colours represent very high altitude clouds (top cloud lower than -70°C). High altitude clouds indicate strong convection associated with intense precipitation.
 Source: Source: NOAA Satellite and Information Service²

¹ National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review date: 21 August 2020, available at: https://www.nhc.noaa.gov/tafb/CAR_18Z.gif and https://www.nhc.noaa.gov/tafb/CAR_12Z.gif

² RAMSDIS Online Archive, NOAA Satellite and Information Service, review date: 21 August 2020, available at: http://rammb.cira.colostate.edu/ramsdisk/online/archive.asp?data_folder=tropical/tropical_ge_14km_wv&width=640&height=480

3 IMPACTS

At the time of this report, according to the information published in the local news^{3 4}, the Rivas, Chinandega, Nueva Segovia and León Departments were affected by this adverse weather. The Autonomous Region of Costa Caribe Norte⁵ was also affected, with heavy rainfall causing flooding in 85 communities in the municipalities of Waspán, Puerto Cabezas, Prinzapolka and Rosita. Due to heavy rains, thousands of people were affected, some houses were damaged by overflowing rivers and damage to farmland was also reported.

Prior to the arrival of Tropical Depression Fourteen and according to the weather reports from Nicaragua’s Institute of Territorial Research⁶ a Tropical Storm Warning was put into effect.

Figure 3 shows some of the flood damage caused by this adverse weather in Nicaragua.



Figure 3 Flood damage caused by this adverse weather period in Nicaragua – August 21 to 24, 2020
Sources: *La Prensa* and *Confidencial*

³ La Prensa, review date: 1 September 2020, available at: <https://www.laprensa.com.ni/>

⁴ El 19 digital, review date: 1 September 2020, available at: <https://www.el19digital.com/>

⁵ In Spanish: Región Autónoma de la Costa Caribe Norte de Nicaragua – RACCN.

⁶ In Spanish: Instituto Nicaragüense de Estudios Territoriales – INETER.

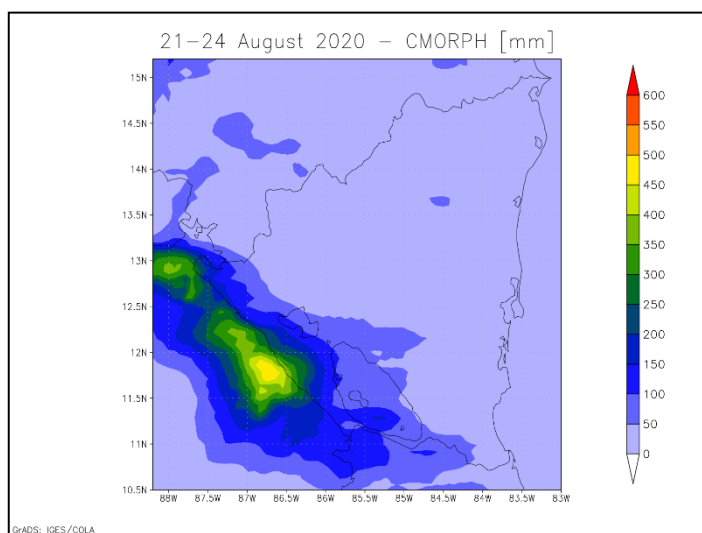
4 RAINFALL MODEL OUTPUTS

All three data sources used by the XSR 2.5 model, CMORPH⁷, WRF5 and WRF7⁸, simulated the occurrence of precipitation over Nicaragua and the surrounding waters during the period August 21-24, 2020. However, each data source reported differing distributions of rainfall, as discussed below.

CMORPH reported total accumulated amounts of precipitation higher than 50 mm over the western part of Nicaragua. The largest values of precipitation were shown along the Pacific coast (in the vicinity of the capital Managua, the area with the highest exposure in the country) with amounts between 400 mm and 450 mm.

WRF5 simulated a pattern similar to that from CMORPH, with rainfall amounts larger than 50 mm mainly over the western sector of the country. However, it reported the largest precipitation values (between 300 mm and 550 mm) further inland compared to CMORPH and mainly over the northern portion of the Pacific coast.

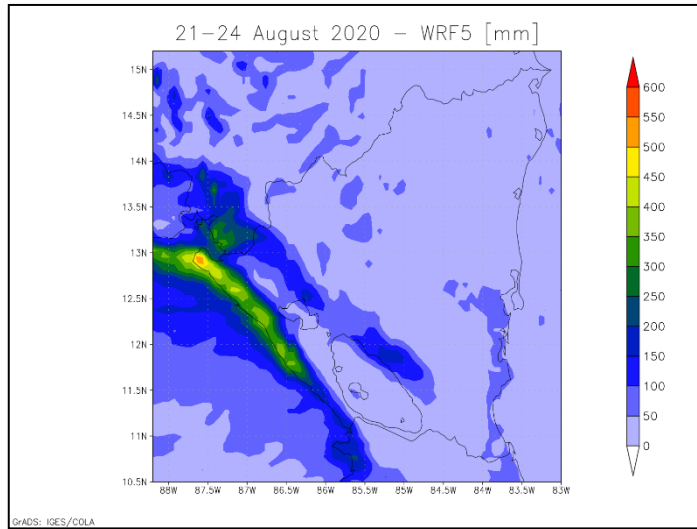
WRF7 showed total accumulated amounts of precipitation with a geographical pattern and values similar to those of WRF5. Additionally, rainfall amounts higher than 100 mm were reported over the south-eastern sector of Nicaragua. However, this area is characterized by low exposure.



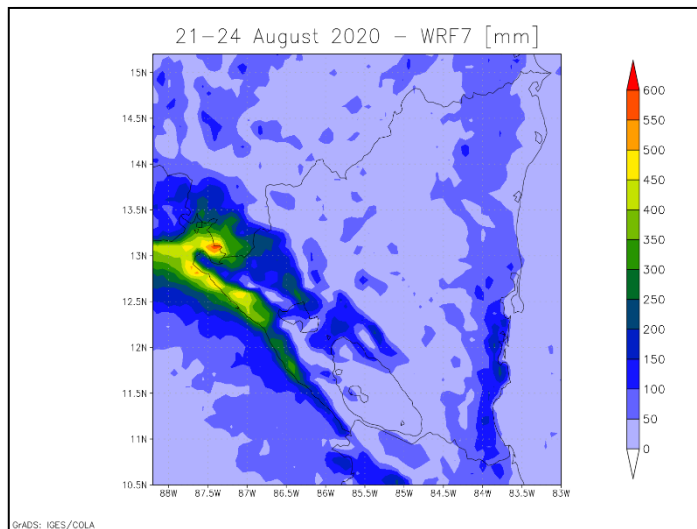
a) CMORPH

⁷ 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.

⁸ 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 Operational Model Global Tropospheric Analyses [<http://rda.ucar.edu/datasets/ds083.2/>]. Further details in the Definitions section of this report.



b) WRF5



c) WRF7

Figure 4 Total accumulated precipitation during the period August 21-24, 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 24-hour aggregation and 72-hour aggregation respectively:

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/NIC/CARE_4_2020/daily_prec_short.mp4

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/NIC/CARE_4_2020/daily_prec_long.mp4

The Rainfall Index Loss (RIL) was above the loss threshold for Nicaragua for all three data sources used by XSR2.5: CMORPH, WRF5 and WRF7. The RIL was similar for all three data sources used, due to comparable accumulated precipitation presented over the area close to the capital Managua, the area characterized by the highest exposure.

The final RIL (RIL_{FINAL}) was calculated as the average of the RILs from the three sources (CMORPH, WRF5 and WRF7). The RIL_{FINAL} was greater than zero and therefore this CARE qualified as a loss event. However, it was below the attachment point of Nicaragua'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 Nicaragua's Excess Rainfall policy and therefore no payout is due.

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

DEFINITIONS

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| <i>Active Exposure Cell Percentage Threshold</i> | 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. |
| <i>Active Exposure Grid Cells</i> | 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. |
| <i>Aggregate Rainfall #1</i> | 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. |
| <i>Aggregate Rainfall #2</i> | 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. |
| <i>Calculation Agent</i> | Entity charged with undertaking the primary calculation of the Rainfall Index Loss. |
| <i>CMORPH-based Maximum Aggregate Rainfall #1</i> | 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. |
| <i>CMORPH-based Maximum Aggregate Rainfall #2</i> | 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. |
| <i>CMORPH-based Covered Area Rainfall Parameters</i> | 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.

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| <i>Rainfall Aggregation Period #1</i> | The number of hours over which the Aggregate Rainfall #1 is computed for all XSR Exposure Grid Cells during a Covered Area Rainfall Event. |
| <i>Rainfall Aggregation Period #2</i> | The number of hours over which the Aggregate Rainfall #2 is computed for all XSR Exposure Grid Cells during a Covered Area Rainfall Event. |
| <i>Rainfall Index Loss</i> | 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. |
| <i>WRF5 Model</i> | 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. |
| <i>WRF7 Model</i> | 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. |
| <i>XSR Rainfall Model</i> | The computer model used to calculate the Rainfall Index Loss, as described in the Attachment entitled ‘Calculation of Rainfall Index Loss and Policy Payment’. |
| <i>XSR Exposure Grid Cells</i> | 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. |
| <i>XSR Grid Cell Exposure Value</i> | 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. |