



Covered Area Rainfall Events (06/02/2024 to 06/02/2024)

Excess Rainfall

Event Briefing

Turks and Caicos

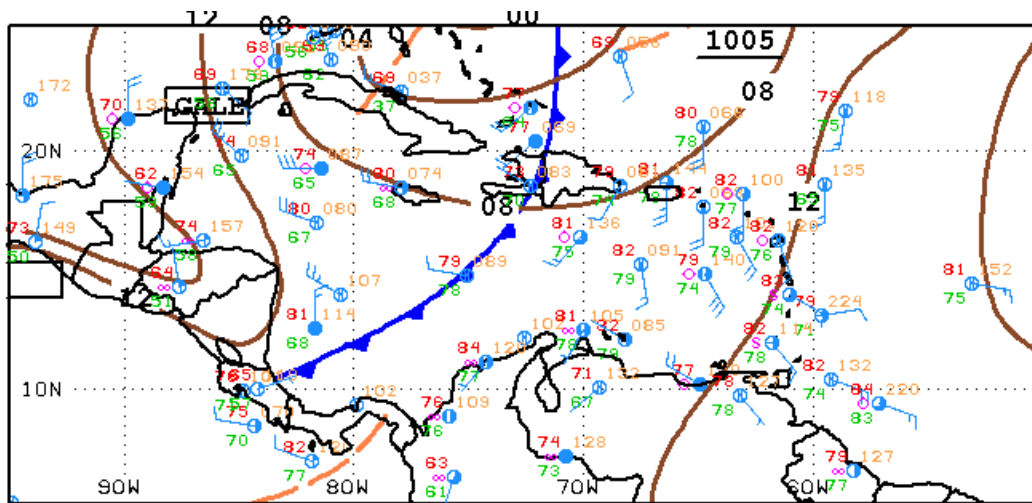
14 February 2024

1 INTRODUCTION

This event briefing describes the impact of rainfall on the Turks and Caicos Islands, which was associated with a Covered Area Rainfall Event (CARE) on 6 February, 2024. The Rainfall Index Loss (RIL) for the Covered Area Rainfall Event was below the attachment point of the country’s Excess Rainfall policy, and therefore no payout is due to the Government of the Turks and Caicos Islands.

2 EVENT DESCRIPTION

On 6 February at 0000UTC, a cold front extended across the northwestern Caribbean Sea, southward of a 1000 mb low pressure system located over the southeast Gulf of Mexico near latitude 26°North, longitude 82°West. During the next 12 hours, the cold front progressed southeastwardly across the northwestern Caribbean Sea and at 1200UTC, its tail end extended from the Turks and Caicos Islands through Hispaniola to Costa Rica (Figure 1). Scattered showers and isolated thunderstorms were reported along and in the vicinity of the cold front (Figure 2). In the subsequent days, the cold front continued to move southeastwardly across the Caribbean Sea and continued to weaken, dissipating on 8 February.



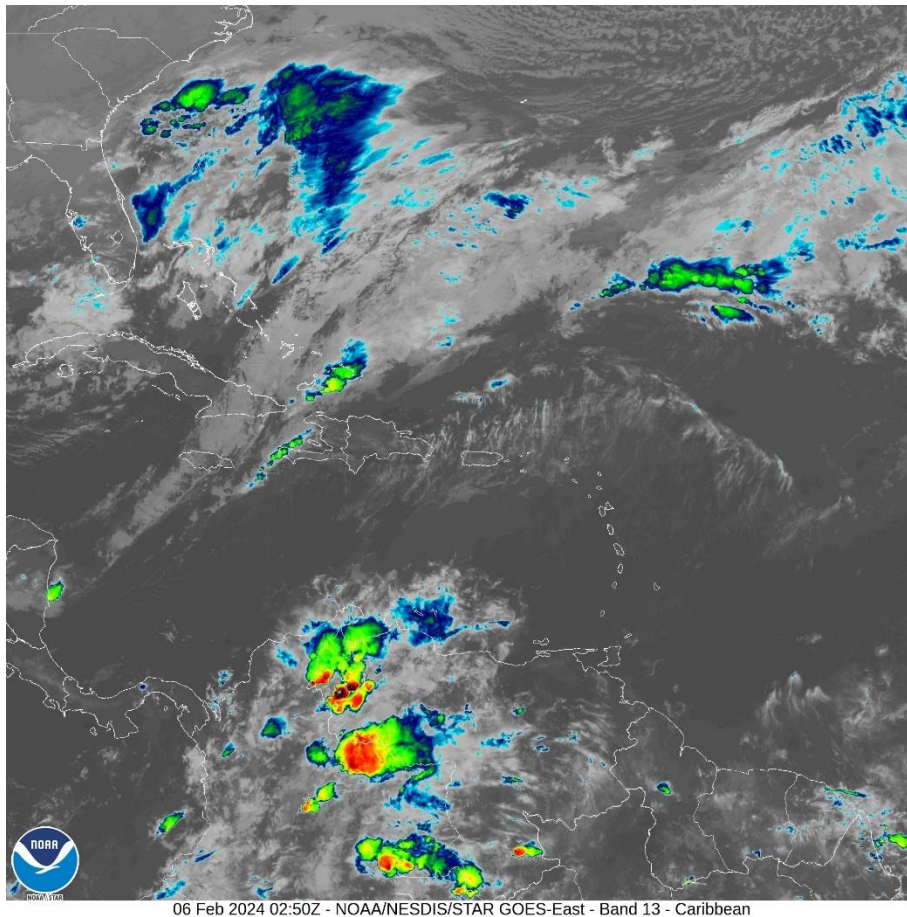
12Z CARIBBEAN SURFACE ANALYSIS
ISSUED:
Tue Feb 6 14: 53: 46 UTC 2024

NATIONAL HURRICANE CENTER
MIAMI, FLORIDA
BY TAFB ANALYST: DELGADO
COLLABORATING CENTERS: NHC OPC

06 February at 1200UTC

Figure 1 Surface analysis over the Caribbean area on 06 February, 2024 at 1200UTC. Source: US National Hurricane Center¹

¹ National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review date: 06 February 2024, available at: https://www.nhc.noaa.gov/tafb/CAR_12Z.gif



06 February at 0300UTC

Figure 2 Satellite imagery on 06 February, 2024. 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: NOAA, National Environmental Satellite, Data and Information Service².

3 IMPACTS

At the time of writing this report, no information was available related to damage or loss in the Turks and Caicos Islands due to this Covered Area Rainfall Event during the indicated period. However, on 7 February, the National Weather Service reported, a high surf warning for all islands.³

² RAMSDIS Online Archive, NOAA Satellite and Information Service, available at:

https://cdn.star.nesdis.noaa.gov/GOES16/ABI/SECTOR/car/13/20240370250_GOES16-ABI-car-13-2000x2000.jpg

³ Caribbean Loop News: [Flash flood watch issued for the Leeward Islands and Anguilla | Loop Caribbean News \(loopnews.com\)](https://loopnews.com)

4 RAINFALL MODEL OUTPUTS

All data sources used by the XSR 3.0 model, CMORPH, IMERG, WRF5, WRF7, WRF11 and WRF15⁴, detected the occurrence of precipitation over the Turks and Caicos Islands and the surrounding waters during the period 4 to 6 February, 2024. Each data source reported a specific distribution and accumulation of rainfall, as discussed below and shown in Figure 4. The CARE for the Turks and Caicos Islands was activated on 6 February and closed on the same day. The CARE was activated due to the use of the 12-hour and the 48-hour aggregation intervals for precipitation⁵ and thus the period considered by the XSR 3.0 model for the loss estimate based on the accumulated precipitation in the Turks and Caicos Islands was 4 – 6 February.

CMORPH reported total accumulated values of precipitation in the range between 60 mm and 90 mm over most of the Turks and Caicos Islands.

IMERG reported total accumulated values of precipitation in the range between 60 mm and 90 mm over most of the country. The maximum values of accumulated rainfall, between 180 mm and 210 mm, were shown over Salt Cay, while lower values, between 60 mm and 90 mm, were shown over the islands of North Caicos, Middle Caicos and East Caicos.

WRF5 showed total accumulated values of precipitation lower than 90 mm over the entire territory of the Turks and Caicos Islands.

WRF7 showed total accumulated values of rainfall in the same range as those of WRF5. The maximum values, between 60 mm and 90 mm, were shown over East Caicos and the southern area of Middle Caicos.

WRF11 showed total accumulated values of precipitation between 120 mm and 210 mm over most of the Turks and Caicos Islands. Higher values, between 210 mm and 240 mm, were reported over a small area of North Caicos.

WRF15 showed total accumulated values of precipitation higher than 60 mm over most of the

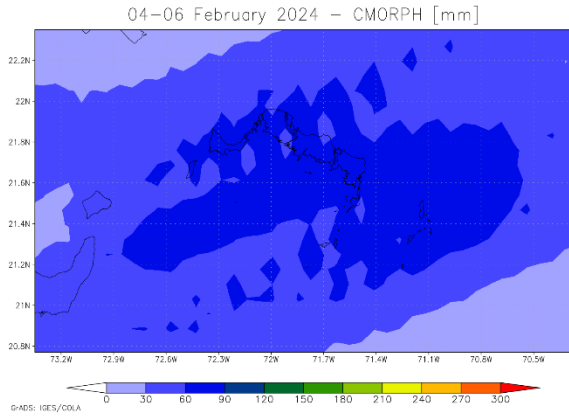
4 CMORPH Model: the satellite-based rainfall precipitation estimates provided by the NOAA Climate Prediction Center (CPC) using the so-called Morphing Technique http://www.cpc.ncep.noaa.gov/products/janowiak/cmorph_description.html. Further details are provided in the Definitions section of this report

IMERG Model: The satellite-based rainfall estimation model developed by NASA, expressed in mm, derived by aggregating the IMERG 30-minute Rainfall Data at 10km spatial resolution and available at <https://jsimpsonhttps.pps.eosdis.nasa.gov/imerg/late>. Further details in the Definitions section of this report

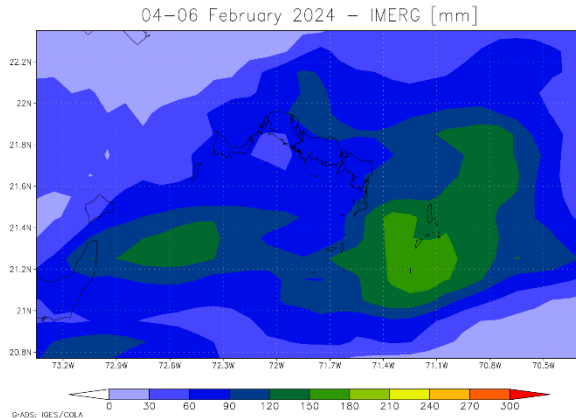
WRF7, WRF11 and WRF15 Models: the Weather Research and Forecasting Model weather model-based Configuration #1 and #2 data <https://www.mmm.ucar.edu/weather-research-and-forecasting-model>. These data are initialised by the NCEP FNL dataset. (NCEP FNL Operational Model Global Tropospheric Analyses [<http://rda.ucar.edu/datasets/ds083.2/>]). Further details are provided in the Definitions section of this report.

5 The two aggregation periods correspond to the Rainfall Aggregation Period #1 and Rainfall Aggregation Period #2, as indicated in the Schedule. Further details in the Definitions section of this report.

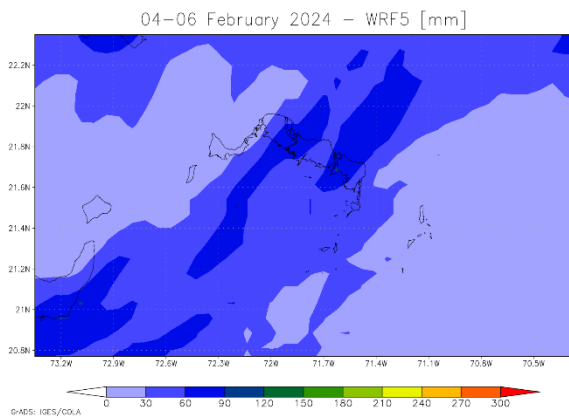
Turks and Caicos Islands. The maximum values, between 150 mm and 210 mm, were shown over the southern area of East Caicos.



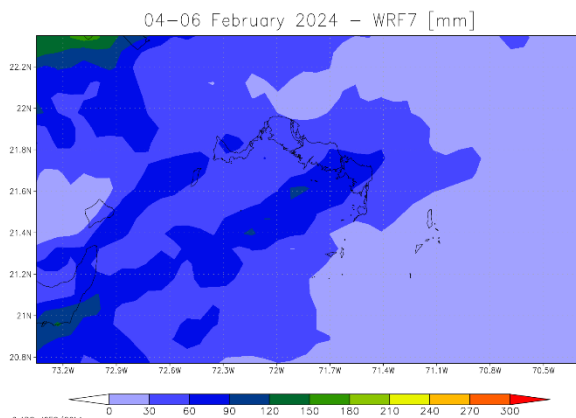
a) CMORPH



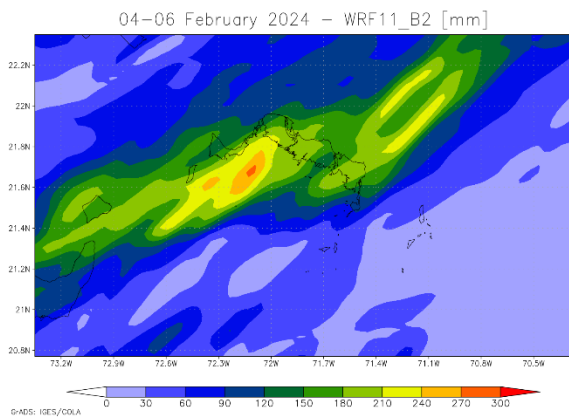
b) IMERG



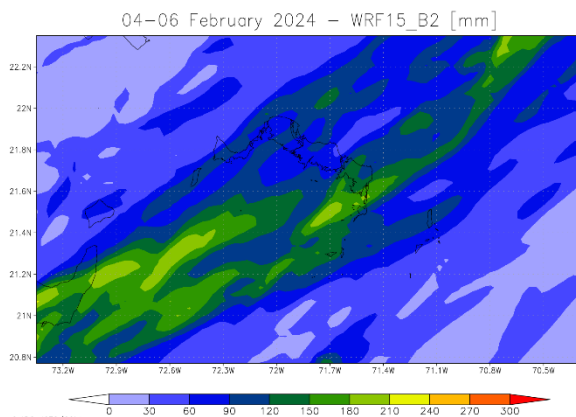
c) WRF5



d) WRF7



e) WRF11



f) WRF15

Figure 4 Total accumulated precipitation during the period 04-06 February, 2024 estimated by CMORPH (a), IMERG (b), WRF5 (c), WRF7 (d), WRF11 (e), WRF15 (f). Source: CCRIF SPC

Daily rainfall maps by CMORPH, IMERG, WRF5, WRF7, WRF11 and WRF15 over the exposure map of XSR 3.0 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/TCA/CARE_4_2023/daily_prec_short.mp4

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/TCA/CARE_4_2023/daily_prec_long.mp4

The Rainfall Index Loss (RIL) was above the loss threshold for the Turks and Caicos Islands for four data sources used by XSR3.0: CMORPH, IMERG, WRF11 and WRF15. The RIL was the highest for WRF11.

The final RIL (RIL_{FINAL}) was calculated as the average of the four RILs from CMORPH, IMERG, WRF11 and WRF15. 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 the Excess Rainfall policy for the Turks and Caicos Islands, and thus the policy was not triggered. Therefore, no payout is due under the Excess Rainfall policy to the Government of the Turks and Caicos Islands.

5 TRIGGER POTENTIAL

The Rainfall Index Loss calculated for the Covered Area Rainfall Event (CARE) for Turks and Caicos on 6 February, 2024 was below the attachment point of the country Excess Rainfall policy and therefore no payout is due.

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

DEFINITIONS

<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.

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.