Covered Area Rainfall Event (09/05/2020 to 20/05/2020)

Excess Rainfall

Event Briefing

Guatemala

28 May 2020

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1 INTRODUCTION

The entry of abundant moisture from both the Caribbean Sea and the Pacific Ocean generated favorable conditions that produced prolonged periods of rain/showers and thunderstorm activity over Guatemala from the first days of May 2020. Adverse weather was produced over the North, West, East, and Centre of Guatemala.

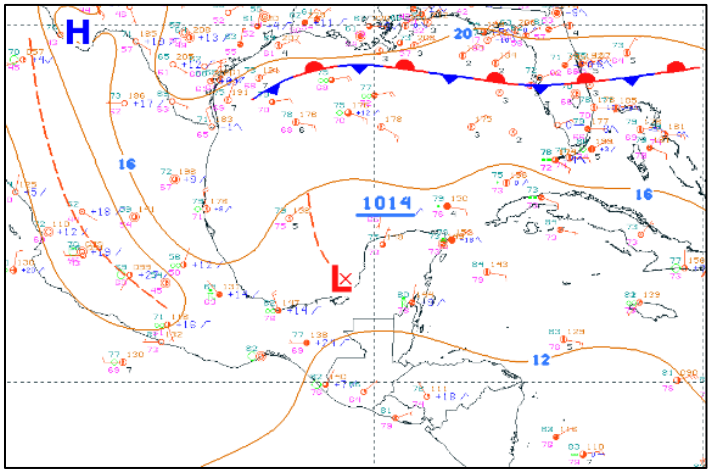
This event briefing describes the impact of the precipitation on Guatemala, which is associated with a Covered Area Rainfall Event (CARE), starting on 9 May and ending on 20 May 2020. The Rainfall Index Loss (RIL) was below the attachment point of the Excess Rainfall policy for Guatemala and therefore no payout is due to the Government of the Republic of Guatemala.

2 EVENT DESCRIPTION

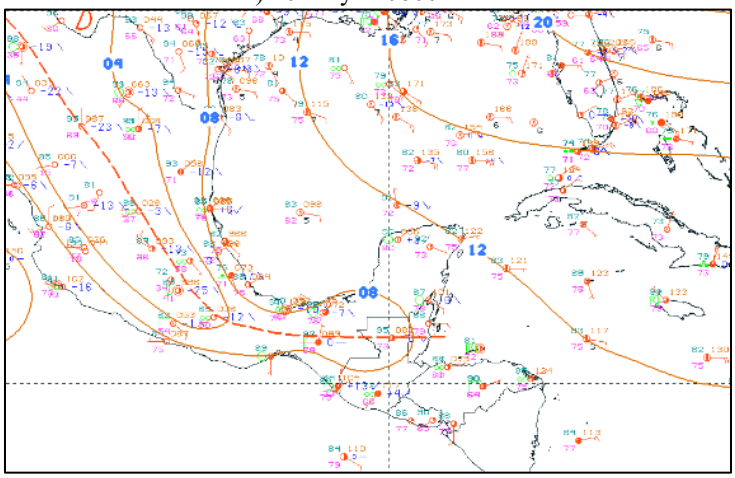
On 9 and 10 May 2020, a stationary front passed over the Gulf of Mexico, moving towards the SE from the NW coast to the waters to the SE of the basin. The combination of the instability associated with the front transition and the presence of a surface low pressure E to the Yucatan Peninsula (Figure 1a) led to several moderate rain showers over the Gulf of Mexico, the Yucatan Peninsula and the southern countries in Central America in the region from 13N to 20N between 83W and 93W.

The significant development during this period was an intense storm on 9 May at 2200UTC NW of Guatemala. The system persisted for over 6 hours and affected with intense precipitation the central and the NW portions of Guatemala, as reported in Figures 2a and 2b. The following day, the stationary front continued its movement towards the SE, heading for Cuba, while the surface low pressure moved eastward, reaching the western edge of the stationary front over the waters to the NW of Cuba. From this point on, the area of perturbed weather moved over Cuba and the NW portion of the Caribbean Sea. Over Guatemala, from 11 to 20 May, conditions of residual instability in association with high humidity in the lower atmosphere favoured the development of scattered moderate rain showers in the afternoon and evening hours (i.e. between 2100UTC and 0300UTC) mainly onshore along the Pacific coast and over the Sierra Madre mountains closer the Pacific Ocean (i.e. involving the SW portion of Guatemala). Examples of the rain showers in these areas are in Figures 2c and 2d.

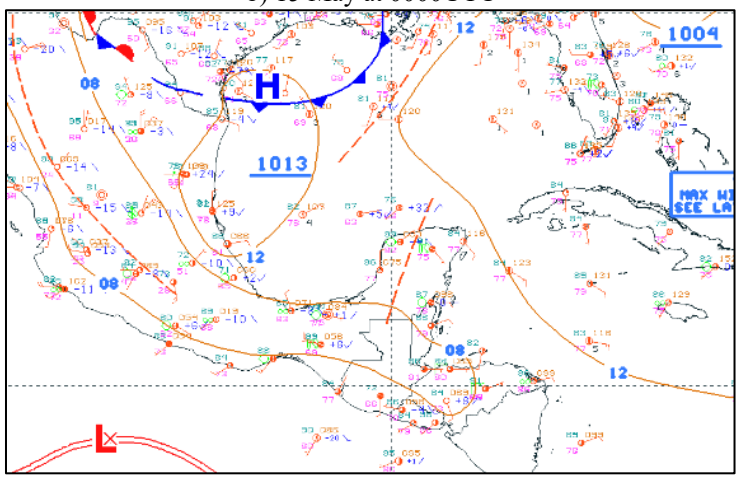
The instability was intensified on 15 May at 0000UTC due to the broadening over Guatemala of a long surface trough extending over Central Mexico with axis NW to SE (Figure 1b). Consequently, widely scattered showers were observed over the Centre of Guatemala between 14 May at 2100UTC and 15 May at 0200UTC. Another intensification occurred on 18 May at 0000UTC, due to the passage of a tropical trough over the Yucatan Peninsula (Figure 1c). It caused scattered moderate to locally intense rain showers over all of Guatemala, particularly the north-eastern sector from 17 May at 2000UTC to 18 May at 0800UTC (Figures 2e and 2f).



a) 10 May at 0600UTC



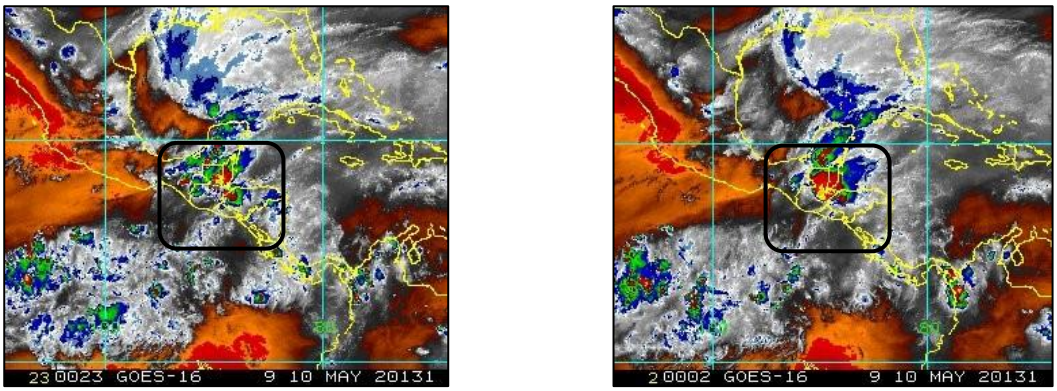
b) 15 May at 0000UTC



c) 18 May at 1800UTC

Figure 1 Surface analysis over the Central America area at different times as indicated in the caption. Source: US National Hurricane Center[1]

[1] National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review dates: from 10 May to 18 May 2020, available at: *https://www.nhc.noaa.gov/tafb/EPAC_00Z.gif*



a) 10 May at 0000UTC

b) 10 May at 0300UTC

c) 14 May at 0000UTC

d) 16 May at 0000UTC

e) 18 May at 0000UTC

f) 18 May at 0300UTC

Figure 2 Satellite imagery at different times as indicated by the captions 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. Dry environment is shaded with orange to dark red colours. Black squares highlight the strong convective activity over Guatemala. Source: NOAA Satellite and Information Service[2]

[2] RAMSDIS Online Archive, NOAA Satellite and Information Service, review dates: from 15 May to 18 May 2020, available at: *http://rammb.cira.colostate.edu/ramsdis/online/archive.asp?data_folder=tropical/tropical_ge_14km_wv&width=640&height=480*

3 IMPACTS

According to the assessment update provided by Guatemala's Disaster Management Agency (in Spanish: Coordinadora Nacional para la Reducción de Desastres - CONRED), due to the impacts of this adverse weather, there were 3 confirmed deaths as of May 21. The departments most severely impacted were Guatemala, Quetzaltenango and San Marcos.

At the time of this report, the following impacts had been reported:

- 154,423 people and 161 homes were affected
- 2 bridges and 7 roads were affected
- Landslides and road blocks were caused by heavy rains
- Fallen trees were observed

Figure 4 shows some of the damage caused by this adverse weather in Guatemala.

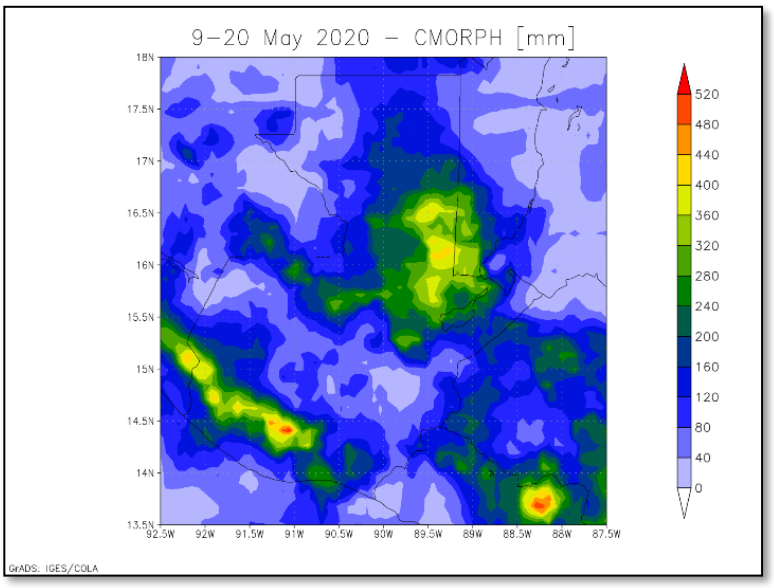
Figure 4 Damage caused by this adverse weather period in Guatemala – May 2020
Source: *Coordinadora Nacional para la Reducción de Desastres*

4 RAINFALL MODEL OUTPUTS

All three data sources used by the XSR 2.5 model, CMORPH[3], WRF5 and WRF7[4], simulated the occurrence of precipitation over Guatemala during the period 9-20 May 2020.

CMORPH reported total accumulated amounts of precipitation higher than 40mm over the majority of Guatemala, with maximum amounts larger than 320 mm and reaching 520 mm over the south-western portion of Guatemala (Sierra Madre and mountain slopes on the Pacific side) and in the range between 320 mm and 440 mm over the eastern portion of Guatemala (from 15.5N to 17N between 89.3W and 89.7W).

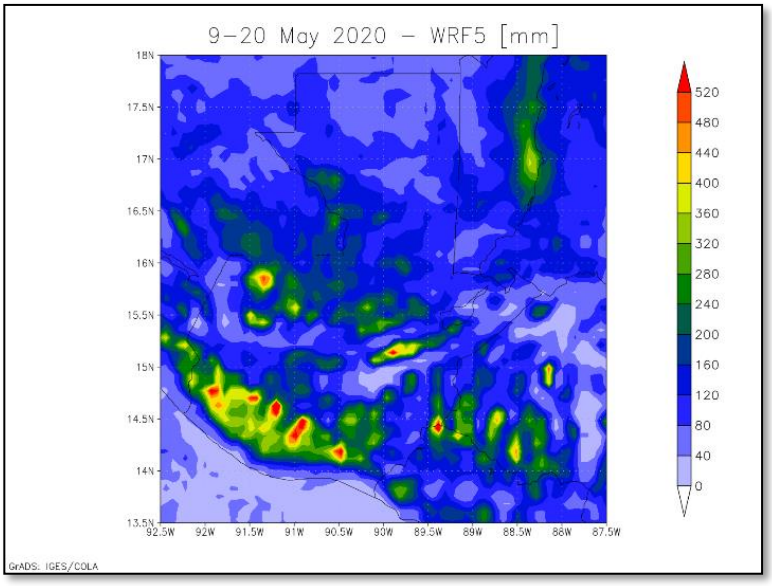
Both WRF simulations produced similar amounts of accumulated rainfall compared with CMORPH over the south-west of Guatemala with higher peaks, but they did not present the other maximum of precipitation in the same position as CMORPH over eastern Guatemala. WRF7 showed an area of precipitation with similar accumulated amounts (with a maximum of 400 mm) located in a more central position, extended from 15N to 17N between 89.5W and 91W, while WRF5 reported bands of precipitation in the interior of the territory (from 15N to 16N between 89.5W and 91.5W) with amounts greater than 360 mm and locally reaching 520 mm.



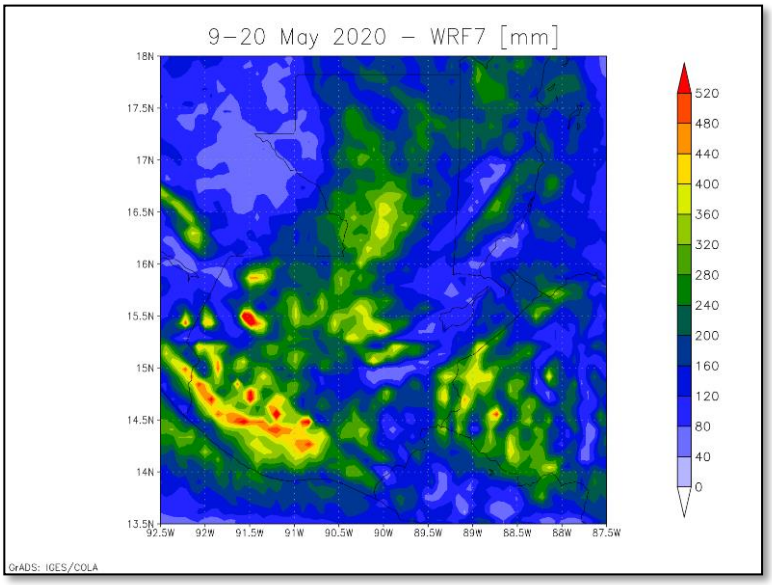
a) CMORPH

[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.



b) WRF5



c) WRF7

Figure 5 Total accumulated precipitation during the period 9-20 May 2020 over Guatemala 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; 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/GTM/CARE_11_2019/daily_prec_short.mp4

https://wemap.ccrif.org/OUTPUT/CCRIF/XSR/Events/GTM/CARE_11_2019/daily_prec_long.mp4

The Rainfall Index Loss (RIL) was above the loss threshold for Guatemala for all the data sources used by XSR2.5, CMORPH, WRF5 and WRF7. The associated RIL was similar for CMORPH and WRF7, while the RIL associated with WRF5 was larger. This was due to the large amounts of accumulated precipitation in the internal territory presented by WRF5 and to the more extended local maxima of precipitation over south-west Guatemala, both areas characterized by high exposure.

The final RIL (RIL_{FINAL}) was calculated as the average of the three data sources RILs. 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 Guatemala'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 the Excess Rainfall policy for Guatemala and therefore no payout is due.

CCRIF expresses empathy with the Government and people of Guatemala for the loss of life and impacts on communities and infrastructure caused by this event.

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.