



Covered Area Rainfall Event (16-18 May 2017)

Excess Rainfall

Event Briefing

25 May 2017

1 INTRODUCTION

In mid-May 2017, Haiti's National Meteorological Centre (Centre National de Météorologie-CNM) indicated that weather conditions in the Caribbean were under the influence of humid air resulting in stormy rains that occurred from 16 to 18 May. The Centre estimated that rainfall affected the entire Haitian territory, particularly the South, South-East, Grand Anse, Artibonite, Central, Northwest and West regions (www.haitilibre.com).

The Caribbean Rainfall Model indicated that a Covered Area Rainfall Event (CARE) was generated in Haiti, starting on 16 May and ending on 18 May 2017.

2 EVENT DESCRIPTION

A 1010 mb low pressure system developed at about 12UTC on 16 May along a surface trough in the western Caribbean that extends from southern Cuba to coastal waters of southern Nicaragua (Figure 1). Consistently, an upper level low pressure located on the west of Florida (Figure 2a) supported the ascending movement of the moist air transported from the Caribbean Sea. This upper level configuration led to heavy showers and scattered thunderstorms over eastern Cuba, the Windward Passage and Haiti on that day.

The upper level features supporting the convection and diverging flow moved slowly towards the SE in the second part of 16 May, while they remained almost stationary over Cuba during the next two days (Figure 2), leading to the continuation of showers for the north-central Caribbean.

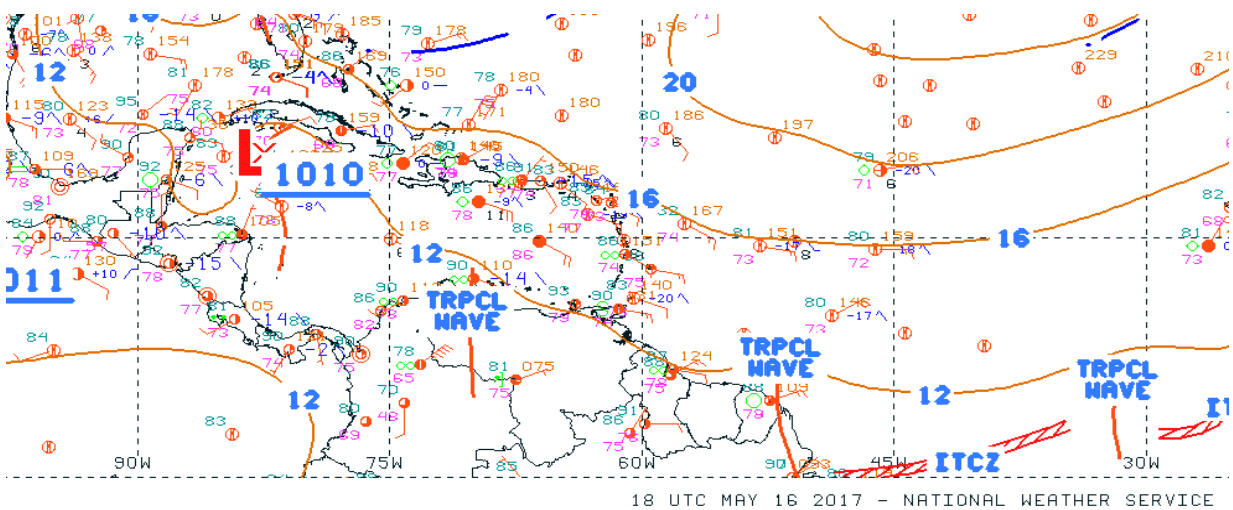


Figure 1 Surface analysis valid at 12UTC on 16 May. Source: <http://www.opc.ncep.noaa.gov/Loops/>

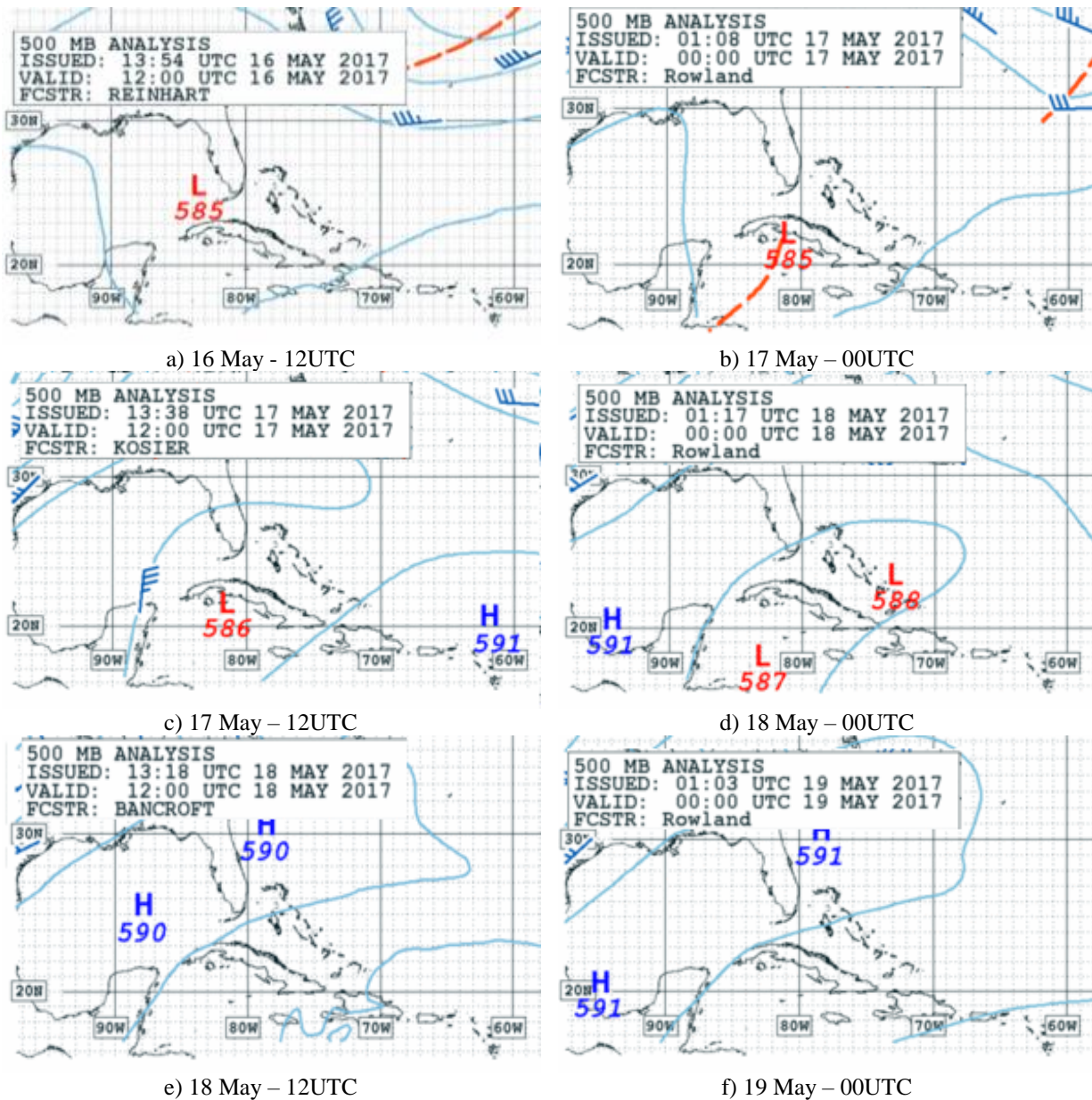


Figure 2 Analysis of the Geopotential Height at 500 mb valid at different hours.

Source: <http://www.opc.ncep.noaa.gov/>

Scattered to numerous showers and thunderstorms were observed on the western side of Haiti, starting from 16 May. The heaviest rain was recorded on the western portion of the island between 00UTC and 12UTC on 17 May (during the night local time, source: <http://www.weather-forecast.com/weather-stations/Port-Au-Prince-Airport>) as confirmed by the large amount of water vapour in the middle/high troposphere (Figure 3), associated with the high level clouds of the thunderstorm.

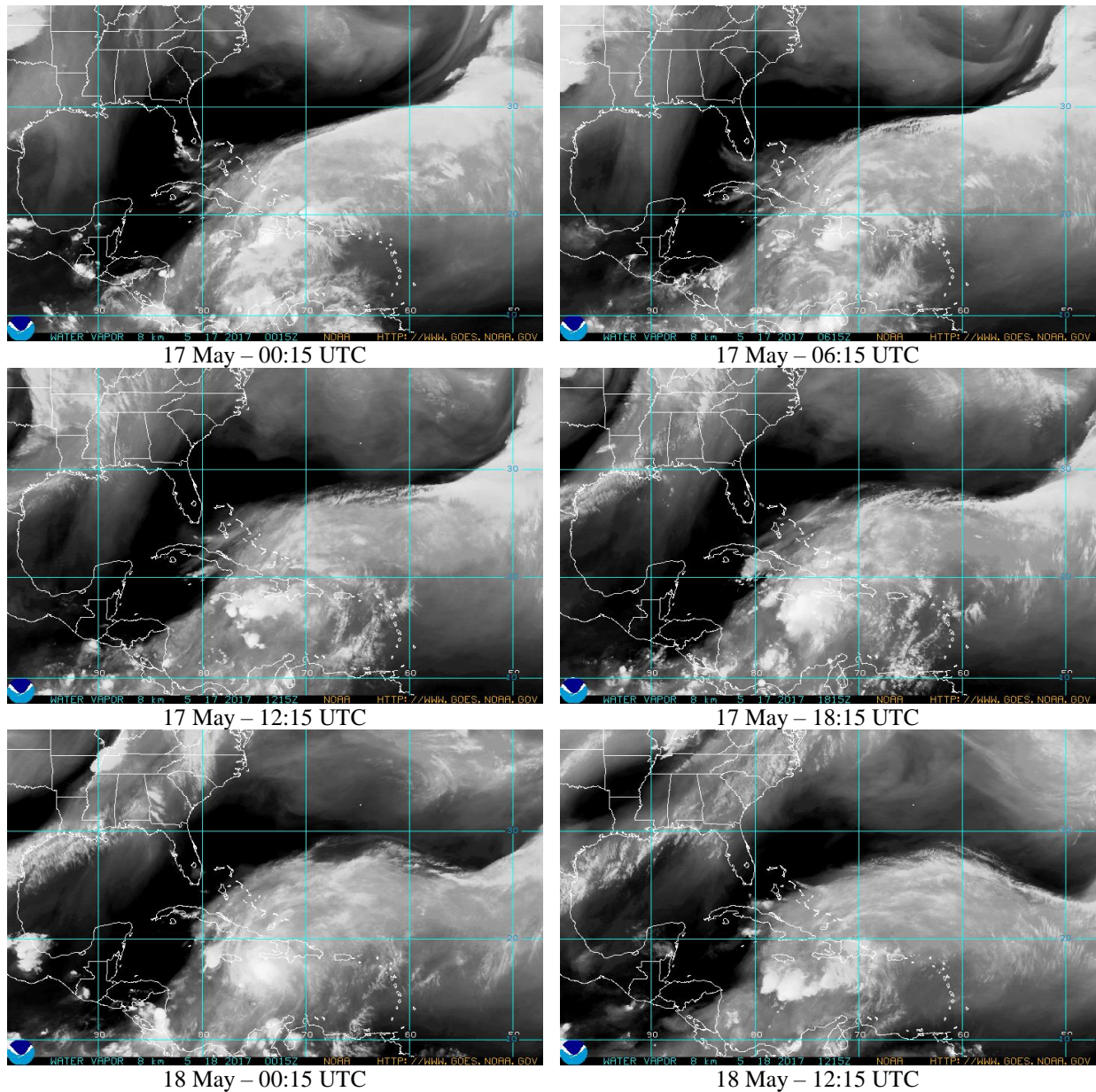


Figure 3 Water vapour images collected by the NOAA's Geostationary Operational Environmental Satellites (GOES) at 8 km of resolution at different hours, as indicated by the labels. *Source:* <http://www.goes.noaa.gov/>

Scattered showers persisted over Haiti up to the early hours of 18 May, while in the following hours, the area with the strongest thunderstorms moved towards the SW, south of Haiti and Jamaica.

Late on 18 May, the persistent upper-level trough (Figure 3) responsible for the deep convective precipitation started to fracture, with the southern part of the trough drifting westward. The deep convective precipitation that affected Haiti started to weaken and dissipate.

3 IMPACTS

As of the date of this report, the following information has been published in the local news (www.haitilibre.com):

- A partial report of Haiti’s Civil Protection Directorate (Direction de la Protection Civile-DPC) on the damage caused by the heavy rains, explained that the population requires rapid response measures.
- Rivers and dry ravines have overflowed, especially in the Great South and Northwest, where several cities were flooded.
- In the South, much infrastructure has been affected. The approach to the Roche-à-Bateau bridge was damaged by floods caused by the overflowing river. Land access to coastal communities on the western tip of the South is difficult.
- As a result of this rainfall event, at least 5 people died when trying to cross overflowing riverbeds; also 19 missing persons were reported.
- In Grande-Anse, 322 people are housed in temporary shelters.

4 RAINFALL MODEL OUTPUTS

The trajectory of the cumulated precipitation reported by CMORPH during the period 16-18 May broadly agrees with the one inferred by the synoptic event description (see previous section) and from the GEOS imagery. From 16 to 17 May the core of the convective precipitation moved from the eastern side of Cuba to the Windward passage to the western side of Haiti, and on 18 May the nucleus moved towards the SW (Figure 4).

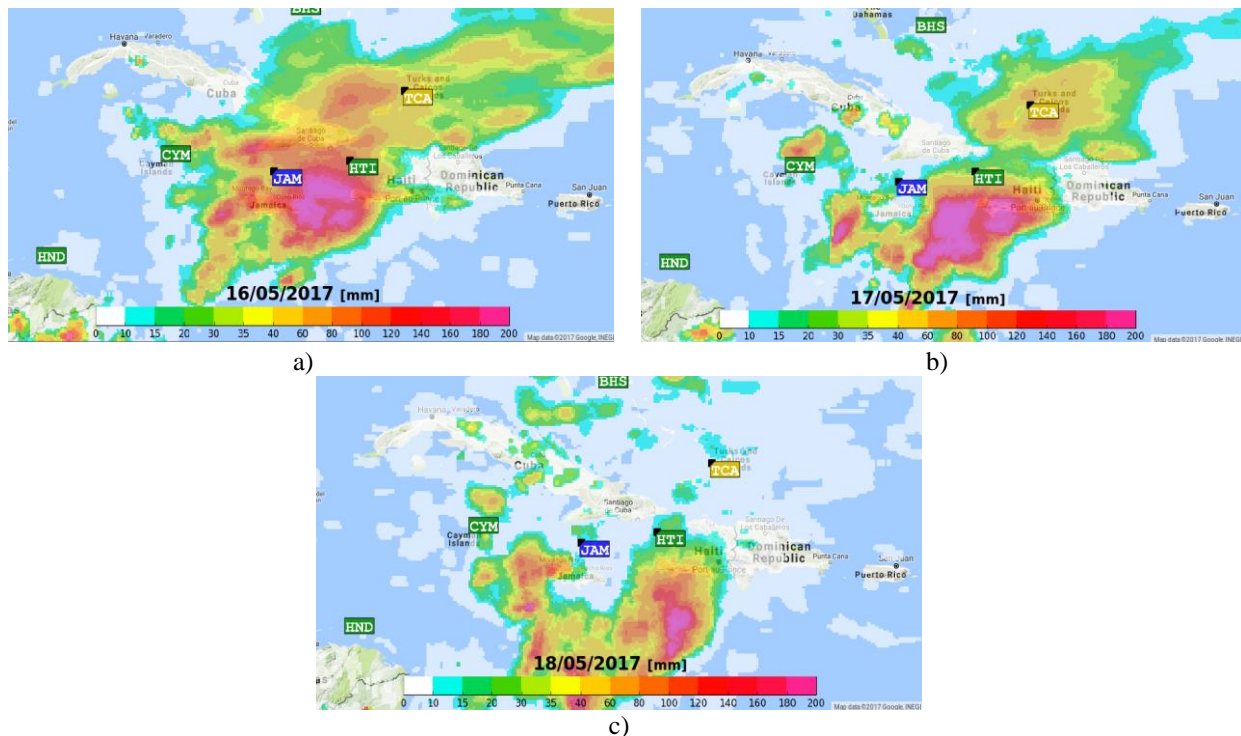


Figure 4 CMORPH cumulated precipitation along: a) 16, b) 17 and c) 18 May, 2017.

Regarding the amount of accumulated precipitation, there was a reasonable agreement (slight overestimation) among the data recorded by four stations in the area surrounding Port-au-Prince (Haiti), reporting total precipitation values ranging between 37 and 54 mm accumulated from 15 to 17 May (with no precipitation recorded on 15 May) (source: <http://www.weather-forecast.com/weather-stations/Port-Au-Prince-Airport>).

5 TRIGGER POTENTIAL

The Rainfall Index Loss calculated for this CARE was below the attachment point of Haiti's Excess Rainfall policy and therefore no payout is due.

CCRIF expresses condolences to the Government and people of Haiti for the loss of life and severe impacts on communities and infrastructure caused by this event.

For further information, please contact ERN-RED, the CCRIF SPC Risk Management Specialist.

Evaluación de Riesgos Naturales
Vito Alessio Robles No.179
Col. Hda Gpe Chimalistac.
Del. Álvaro Obregón. Cp 01050, México D.F.
+52 (55) 5616-8161, 62, 64
cavelar@ccrif.org

DEFINITIONS

Active Exposure Cell Percentage Threshold	The percentage of the total number of XSR Exposure Grid Cells as defined in the Schedule, with in the covered Area of the Insured, which when exceeded triggers a Covered Area Rainfall Event.
Active Exposure Grid Cells	The XSR Exposure Grid Cells for which in the same single day the Average Aggregate Rainfall value computed using the CMORPH-based Rainfall Estimate equals or exceeds the Rainfall Event Threshold.
Average Rainfall	Aggregate The Average Aggregate Rainfall amount (where the number of days in the Rainfall Aggregation Period is defined in the Schedule) as measured in millimeters per day (mm/day) in any of the XSR Exposure Grid Cells in the Covered Area of the Insured. For a given number of days n, the n-day aggregation period is the average of rainfall on the day itself and on the previous n-1 days.
Calculation Agent	Entity charged with undertaking the primary calculation of the Rainfall Index Loss as described in the Calculation Agency Agreement.
CMORPH-based Maximum Average Aggregate Rainfall	The maximum value during the Covered Area Rainfall Event of the Average Aggregate Rainfall computed using the CMORPH-based Daily 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 Daily Rainfall Estimates using the XSR Rainfall Model. Parameters are drawn from XSR Exposure Grid Cells within the Covered Area of the Insured as identified in the Cell Identification and Rainfall Exposure Value Table in the Schedule, 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 event will not be considered.
Maximum Average Aggregate Rainfall	The highest value during a Covered Area Rainfall Event of the Average Aggregate Rainfall amount in any of the XSR Exposure Grid Cells in the Covered Area of the Insured computed.
Rainfall Event Threshold	Average Aggregate Rainfall level as defined in the Schedule which should be exceeded to trigger an Active Exposure Cell.
Rainfall Aggregation Period	The number of days over which the Average Aggregate Rainfall 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.
WRF1 Model	The weather research and forecasting rainfall model by NOAA with Configuration #1 data initialized 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 the Policy.
WRF2 Model	The weather research and forecasting rainfall model by NOAA with Configuration #2 data initialized 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, as provided in the Schedule.
- XSR Grid Cell Exposure Value** The value, as shown in the Cell Identification and Rainfall Exposure Value Table in the Schedule, used to calculate the CMORPH-based Exposure Grid Cell Loss, the WRF1-based Exposure Grid Cell Loss, and the WRF2-based Exposure Grid Cell Loss.