



Tropical Cyclone Grace (AL072021)

Wind and Storm Surge

Final Event Briefing

Jamaica and the Cayman Islands

29 August 2021

1 SUMMARY

Tropical Cyclone (TC) Grace was the seventh tropical cyclone in the 2021 Atlantic Hurricane Season. Reported on 13 August as Potential Tropical Cyclone Seven, it was soon upgraded to Tropical Depression Seven and consequently, to Tropical Storm Grace, which was first identified as a small tropical storm. On 14 August at 1500 UTC, it became stronger and resulted in stormy weather with heavy rainfall across the Lesser Antilles. On 15 August the NHC reported that Tropical Storm Grace became a tropical depression again. On 16 August, at 1200 UTC the Government of Jamaica issued a Tropical Storm Watch for Jamaica and at 1500 UTC the same day the Government of the Cayman Islands issued a Tropical Storm Warning for the Cayman Islands. Over 17 and 18 August, Tropical Depression Grace gradually strengthened becoming a tropical storm again as it approached Jamaica and the Cayman Islands, which resulted in heavy rains and gusty winds in both countries.

Final runs of the CCRIF loss model for wind and storm surge produced government losses for Jamaica and the Cayman Islands. In both cases, these losses were below the attachment point of these countries' tropical cyclone policies. Therefore, no payout under the policy is due for these countries.

The Aggregated Deductible Cover (ADC) for these countries' TC policies was not activated because there was no declaration of a Disaster Alert for Jamaica and the Cayman Islands by ReliefWeb related to Tropical Cyclone Grace. In addition, the modelled losses were less than 50 per cent of the attachment point therefore, no payment under the ADC feature is due for these countries.

This event briefing is designed to review the modelled losses due to wind and storm surge calculated by CCRIF's SPHERA TC model for affected CCRIF member countries, to be analyzed with respect to members' tropical cyclone policies. A separate report on rainfall impacts on affected CCRIF member countries with excess rainfall policies will be issued if applicable.

2 INTRODUCTION

On 13 August at 1500 UTC, the US National Hurricane Center (NHC) reported a disturbance over the central tropical Atlantic which was named Potential Tropical Cyclone Seven. Its centre was near latitude 15.3 North, longitude 49.3 West. The disturbance was soon upgraded to Tropical Depression Seven. On 14 August at 0900 UTC, the NHC reported that Tropical Depression Seven was upgraded to Tropical Storm Grace, characterized as a small tropical storm. At 1500 UTC Tropical Storm Grace became stronger as it moved quickly westward toward the Leeward Islands, producing stormy weather with heavy rainfall across the Lesser Antilles. On 15 August at 2100 UTC, the NHC reported that Tropical Storm Grace became a tropical depression again. The centre of Tropical Depression Grace was located near latitude 17.0 North, longitude 67.3 West. The depression was moving toward the west with the velocity near 15 mph (24 km/h). Maximum sustained winds decreased to 35 mph (55 km/h) with higher gusts and the estimated minimum central pressure was 1011 mb. During the next 12 hours these parameters were almost unchanged.

On 16 August, at 1200 UTC the Government of Jamaica issued a Tropical Storm Watch for Jamaica and at 1500 UTC the same day the Government of the Cayman Islands issued a Tropical Storm Warning for the Cayman Islands. The centre of Tropical Depression Grace was located near latitude 17.7 North, longitude 71.4 West, moving toward the west with unchanged velocity. Maximum sustained winds were also unchanged, while minimum central pressure decreased to 1007 mb. During the next 9 hours maximum sustained winds and minimum central pressure remained the same, while velocity decreased to 13 mph (20 km/h).

The following day, 17 August, the NHC reported that Tropical Depression Grace was gradually strengthening as it approached Jamaica and the Cayman Islands. At 0600 UTC it was upgraded to a tropical storm again. Therefore, at 1200 UTC the Government of Jamaica changed the Tropical Storm Watch for Jamaica to a Tropical Storm Warning for the country. At 1500 UTC tropical storm conditions were spreading over Jamaica (Figure 1a). The centre of Tropical Storm Grace was located near latitude 18.3 North, longitude 76.8 West and it continued its movement toward the west with a velocity near 15 mph (24 km/h). Maximum sustained winds were near 50 mph (85 km/h) with higher gusts and the estimated minimum central pressure was 1005 mb. Tropical-storm-force winds extended outward up to 70 miles (110 km) from the centre of the storm. These conditions remained almost unchanged throughout the next 6 hours, which resulted in a spread of heavy rains over Jamaica. At 2100 UTC, the centre of the storm was located at latitude 18.4 North, longitude 77.9 West, near the northwest coast of Jamaica, about 10 km south of Montego Bay and about 360 km east-southeast of Grand Cayman (Figure 2a). Minimum central pressure decreased to 1003 mb and tropical-storm-force winds extended outward up to 80 miles (130 km) from the centre of the storm which led to continuation of the tropical storm conditions over parts of Jamaica. The Government of the Cayman Islands issued a Hurricane Watch for the Cayman Islands.

On 18 August at 0900 UTC the Government of Jamaica discontinued the Tropical Storm Warning for the country. However, the storm continued to strengthen and the outer bands with heavy rains and gusty winds began to spread over the Cayman Islands (Figure 2a). At 1200 UTC, the location of Tropical Storm Grace was near latitude 18.8 North, longitude 80.9 West,

about 30 km southwest of Grand Cayman (Figure 2b). The system was moving toward the west-northwest with velocity near 16 mph (26 km/h). Maximum sustained winds were near 65 mph (100 km/h) with higher gusts and the minimum central pressure was 993 mb. Tropical-storm-force winds extended outward up to 115 miles (185 km) from the centre of the storm. Wind gusts to hurricane force also were reported on Grand Cayman. These conditions led to continuation of heavy rains and strong winds across the Cayman Islands. At 1500 UTC the NHC reported that Tropical Storm Grace became Hurricane Grace west of Grand Cayman, at the location latitude 19.4 North, longitude 82.2 West (about 105 km west of Grand Cayman). However, the Government of the Cayman Islands discontinued the Hurricane Watch for the country.

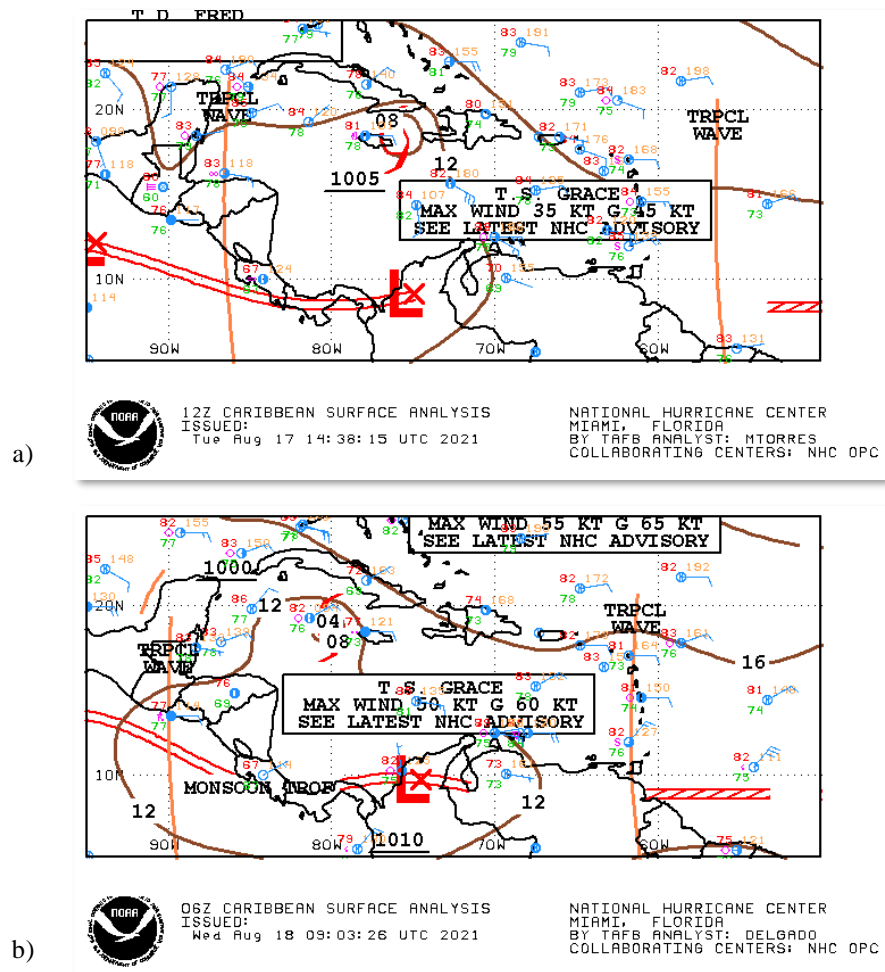


Figure 1 Surface analysis over the Caribbean area on 17 (a) and 18 August (b) at the different times as indicated by the labels. Source: US National Hurricane Center¹

¹ National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, available at:
https://www.nhc.noaa.gov/tafb/CAR_12Z.gif
https://www.nhc.noaa.gov/tafb/CAR_06Z.gif

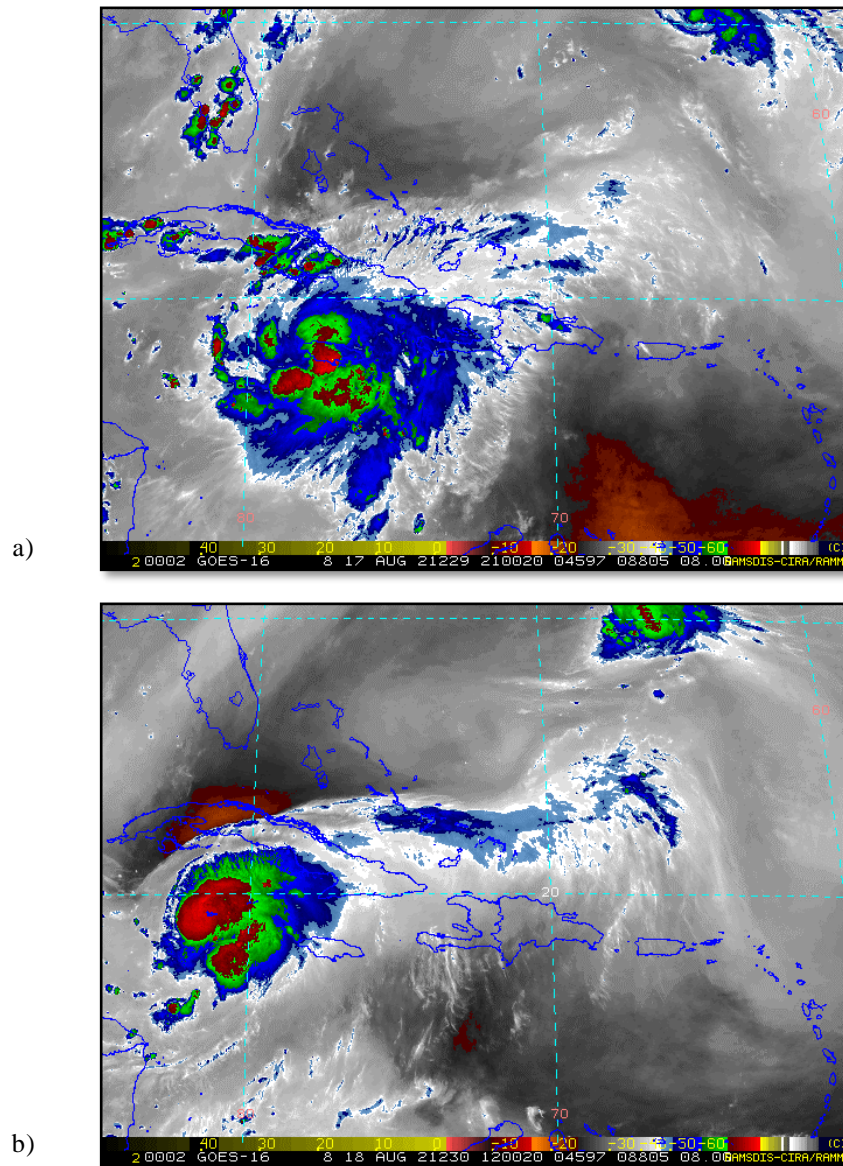


Figure 2 Satellite imagery on 17 August at 2100 UTC (a) and on 18 August at 1200 UTC (b) as indicated in the label from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between -50°C and -70°C), while the red/yellow colours represent very high altitude clouds (top cloud lower than -70°C). High altitude clouds indicate strong convection associated with intense precipitation. Source: NOAA Satellite and Information Service².

² RAMSDIS Online Archive, NOAA Satellite and Information Service, available at:
https://rammb.cira.colostate.edu/ramsdisk/online/images/rmtc/rmtcsasec4ir304/rmtcsasec4ir304_20210817210020.gif
https://rammb.cira.colostate.edu/ramsdisk/online/images/rmtc/rmtcsasec4ir304/rmtcsasec4ir304_20210818120020.gif

3 CCRIF SPC MODEL OUTPUTS

Under CCRIF’s loss calculation protocol, a CCRIF System for Probabilistic Hazard Evaluation and Risk Assessment (SPHERA) report is required for any tropical cyclone affecting at least one member country with winds greater than 39 mph (62.7 km/h). Tropical Cyclone Grace qualified as a Loss Event³ for both Jamaica and the Cayman Islands.

The wind footprint (Figures 3 and 4) and surge field are two of the outputs from the CCRIF model, which show the regions affected by Tropical Cyclone Grace in each country. Due to the relatively low wind speeds, storm surge was insignificant, did not contribute to the damage, and is therefore not shown on the hazard maps.

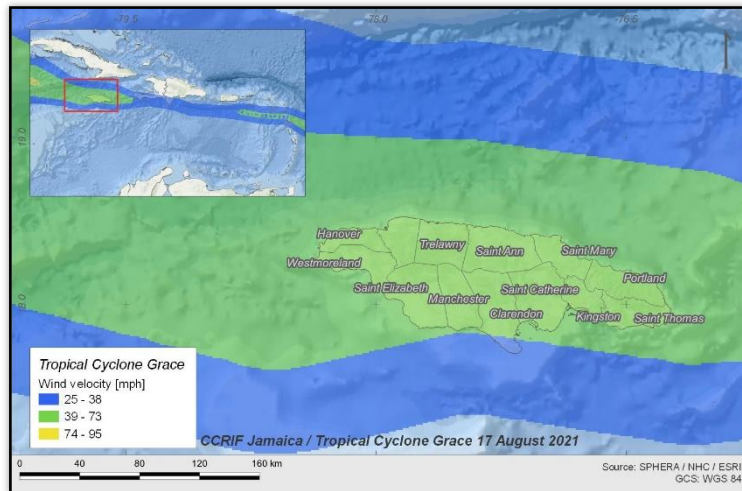


Figure 3 Map showing the wind field associated with Tropical Cyclone Grace in Jamaica.
Source: NHC & CCRIF/SPHERA

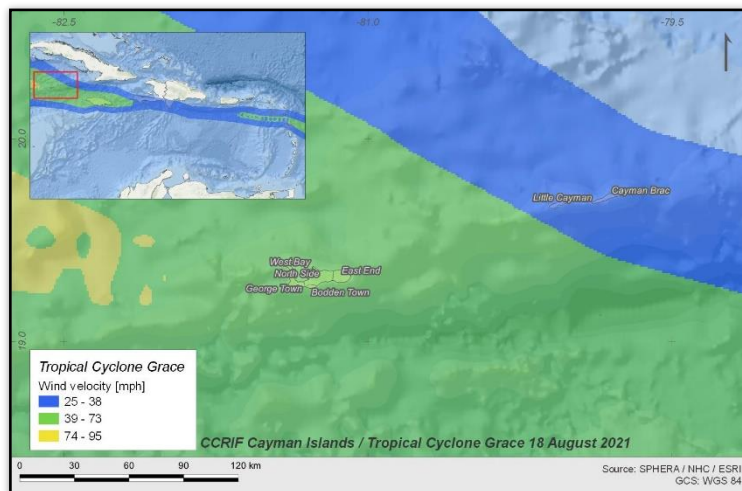


Figure 4 Map showing the wind field associated with Tropical Cyclone Grace in the Cayman Islands.
Source: NHC & CCRIF/SPHERA

³ Any Tropical Cyclone event which produces a modelled loss greater than zero in one or more policyholder countries.

4 IMPACTS

Jamaica

According to the assessments provided by the Caribbean Disaster Emergency Management Agency⁴ (CDEMA), Tropical Storm Grace caused flooding, fallen trees, landslides, and blocked roads. The Figure 5 shows affected parishes.

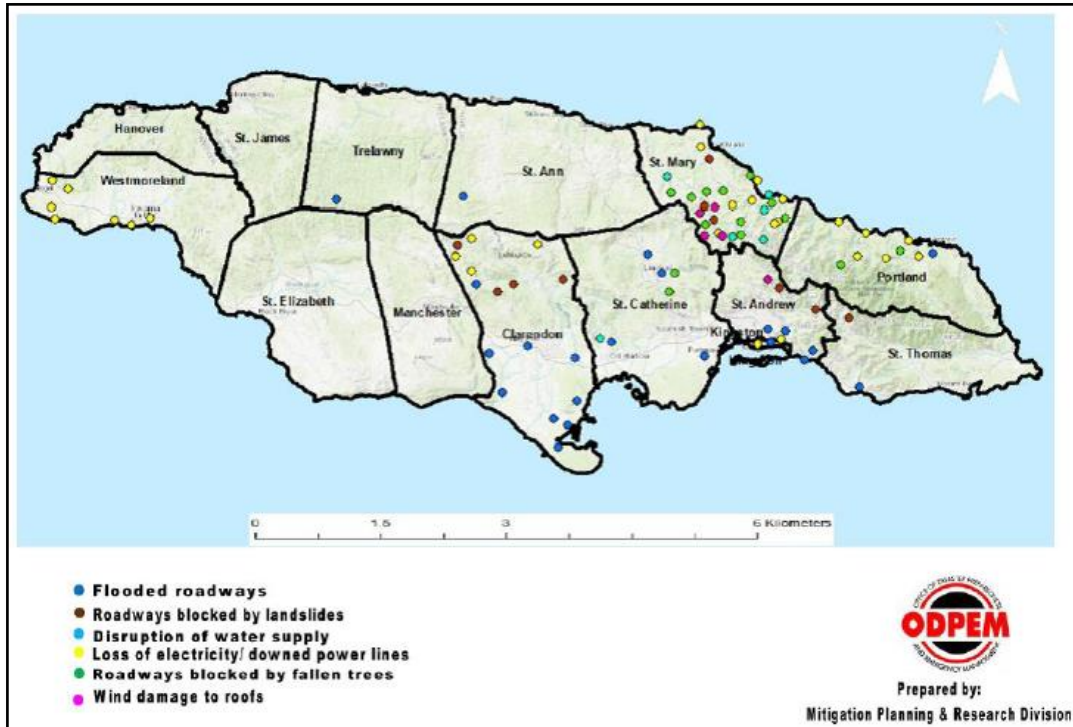


Figure 5 Map showing the affected Parishes associated with Tropical Cyclone Grace in Jamaica.
Source: CDEMA

Prime Minister of Jamaica, Hon. Andrew M. Holness, reported that the parishes with the greatest damage were Kingston, St. Andrew, St. Thomas, Portland, St. Mary, and Clarendon. About 200 roads were affected. There was no reported loss of life due to Tropical Storm Grace⁵.

Ten days after the passage of Tropical Storm Grace, the following information had been published in the local news⁶:

- Due to fallen poles and trees, roads were blocked
- Homes were flooded and vehicles disabled

⁴ CDEMA - Caribbean Disaster Emergency Management Agency, Situation Report No. 2 (As of 4:00 PM on August 19, 2021), review date: 19 August 2021, available at: [‘Tropical Storm Grace’](#)

⁵ Jamaica Observer, review date: 20 August 2021, available at: [‘Damage from Grace put at \\$171m’](#)

⁶ The Gleaner Company, review date: 20 August 2021, available at: [‘Grace but no mercy: Storm drenches eastern Jamaica’](#)

- In St. Mary and Portland powerful winds damaged croplands
- The roof of the Annotto Bay Fire Station was partially damaged
- The Bull Bay main road in St. Andrew and Marcus Garvey Drive in Kingston were impassable
- Several communities in St. Mary were flooded
- There were landslides and floods in east and west rural St. Andrew
- The power network in Kingston, St. Andrew, St. Catherine, St. Thomas, St. Mary, and St. Ann was damaged.

Prior to the arrival of the storm, a Tropical Storm Warning was put into effect. Jamaica's authorities took precautionary measures such as opening some emergency shelters and air traffic was temporarily suspended.

Figure 6 shows some of the wind damage caused by Tropical Storm Grace in Jamaica.



Figure 6 Some of the wind damage caused by Tropical Storm Grace in Jamaica – August, 2021.
Source: The Gleaner Company

Cayman Islands

According to assessments provided by the Caribbean Disaster Emergency Management Agency (CDEMA) due to Tropical Storm Grace, downed power lines and fallen trees generated the greatest damage in the Cayman Islands, but no injuries were reported. Premier of the Cayman Islands, Hon. G. Wayne Panton, reported that “we are certainly graced in the fact that we have had no loss of life”.

Ten days after the passage of Tropical Storm Grace and according to information published in the local news⁷, due to Tropical Storm Grace, the most significant damage was reported in the island of Grand Cayman; the majority of the impacts were related to flooded neighbourhoods, numerous trees uprooted and miles of power and communication lines downed resulting in interruptions of electric power across Grand Cayman.

⁷ Cayman Compass, review date: 20 August 2021, available at: [‘Major clean-up operation in wake of Tropical Storm Grace’](#)

Prior to the arrival of the storm, a Hurricane Watch was put into effect. The Cayman Islands' authorities took precautionary measures such as activating the National Emergency Operations Centre (NEOC). Also, the authorities temporarily closed government offices and opened some emergency shelters.

Figure 7 shows some of the wind damage caused by Tropical Storm Grace in the Cayman Islands.



Figure 7 Some of the wind damage caused by Tropical Storm Grace in the Cayman Islands – August, 2021.
Source: Cayman Compass⁸

⁸ Cayman Compass, review date: 20 August 2021, available at: [‘Photo gallery: Aerial view of Tropical Storm Grace destruction’](#)

5 CCRIF LOSS MODEL

Final runs of the CCRIF loss model for wind and storm surge produced government losses for both Jamaica and the Cayman Islands, which were below the attachment point of each country's tropical cyclone policy. Therefore, no payments are due under the policies for Jamaica and the Cayman Islands.

The Aggregated Deductible Cover (ADC) for these countries' TC policies was not activated because there was no declaration of a Disaster Alert for Jamaica and the Cayman Islands by ReliefWeb related to Tropical Cyclone Grace. In addition, the modelled losses were less than 50 per cent of the attachment point of each policy and therefore, no payment under the ADC feature is due for these countries.

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