



# **Tropical Cyclone Fred (AL062021)**

## **Wind and Storm Surge**

### **Final Event Briefing**

#### **Haiti**

**23 August 2021**

## 1 SUMMARY

Tropical Storm Fred was the sixth tropical cyclone in the 2021 Atlantic Hurricane Season. This tropical disturbance was reported by National Hurricane Center on 9 August and was named Potential Tropical Cyclone Six, strengthening while approaching the Leeward Islands. On 10 August, a Tropical Storm Watch was issued for northern Haiti. On 11 August Potential Tropical Cyclone Six was upgraded to Tropical Storm Fred while passing over the Dominican Republic. The following day, 12 August, Tropical Storm Fred weakened to become a tropical depression while it was passing over Haiti, bringing heavy rainfall to that country.

Final runs of the CCRIF loss model for wind and storm surge produced government losses for Haiti, which were below the attachment point of this country's tropical cyclone policy. Therefore, no payout under the policy is due.

The Aggregated Deductible Cover (ADC) for this country's TC policy was not activated because there was no declaration of a Disaster alert for Haiti related to Tropical Storm Fred by ReliefWeb and therefore, no payment under the ADC is due.

This event briefing is designed to review the modelled losses due to wind and storm surge calculated by CCRIF's models 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 9 August at 2100 UTC, a tropical disturbance in the Atlantic was reported by the US National Hurricane Center (NHC). The tropical disturbance was named Potential Tropical Cyclone Six. The estimated centre of this formation was near latitude 14.7 North, longitude 60.1 West, approaching the Leeward Islands with a velocity of near 15 mph (24 km/h) as it moved toward the west-northwest. Maximum sustained winds were near 35 mph (55 km/h) with higher gusts and the estimated minimum central pressure was 1010 mb. Over the next 12 hours the maximum sustained winds and minimum central pressure were almost unchanged. A slight increase in velocity was noted.

The following day, 10 August at 0300 UTC, a Tropical Storm Watch was issued for northern Haiti from the border with the Dominican Republic to Gonaïves. At 0900 UTC it was reported that Potential Tropical Cyclone Six was located in the northeastern Caribbean Sea. The centre of the disturbance was near latitude 15.7 North, longitude 62.2 West. The system moved toward the west-northwest with a velocity of near 17 mph (28 km/h). At 1500 UTC an increase in velocity and minimum central pressure was noted. The velocity was almost 18 mph (30 km/h) and the estimated minimum central pressure was 1012 mb. During the next six hours these parameters were largely unchanged.

On 11 August at 0300 UTC, NHC reported that Potential Tropical Cyclone Six was upgraded to Tropical Storm Fred south of Puerto Rico. The centre of newly formed Tropical Storm Fred was located near latitude 17.4 North, longitude 66.8 West. Tropical Storm Fred moved toward

the west with a velocity near 17 mph (28 km/h), maximum sustained winds were near 40 mph (65 km/h) with higher gusts and the estimated minimum central pressure decreased to 1009 mb . During the following 9 hours, maximum sustained winds and velocity remained the same, while minimum central pressure continued to decrease and reached 1006 mb . At 1500 UTC, the centre of Tropical Storm Fred was located near latitude 18.2 North, longitude 69.7 West, about 40 km south-southeast of the Dominican Republic. It moved toward the west-northwest with velocity near 16 mph (26 km/h), with increased maximum sustained winds of 45 mph (75 km/h) and the same minimum central pressure. Tropical-storm-force winds extended outward up to 60 miles (95 km) mainly to the northeast of the centre.

On 12 August at 0000 UTC, NHC reported that Tropical Storm Fred weakened to become a tropical depression. The centre of the tropical depression was located near latitude 19.2 North, longitude 71.6 West, about 85 km southeast of Cap-Haitien, Haiti. This system moved toward the west-northwest with a velocity near 15 mph (24 km/h). Maximum sustained winds decreased to near 35 mph (55 km/h) with higher gusts and minimum central pressure increased to 1009 mb. The conditions remained the same over the following 6 hours and brought heavy rainfall over Haiti. At 0300 UTC, the centre of Tropical Depression Fred was located near latitude 19.5 North, longitude 72.2 West, about 35 km south of Cap-Haitien, Haiti, resulting in additional heavy rainfall over Haiti (Figure 1). At 0600 UTC Tropical Depression Fred was disorganized over northwestern Haiti (Figure 2). With constant movement to the west-northwest at a velocity of near 15 mph (24 km/h) Tropical Depression Fred moved over the surrounding waters, which led to the cancellation of the Tropical Storm Watch for Haiti at 1500 UTC.

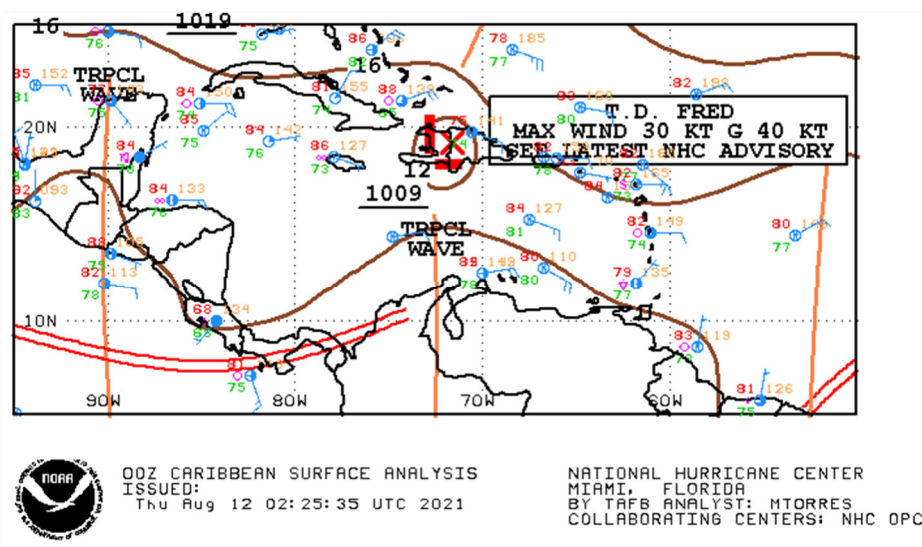


Figure 1 Surface analysis over the Caribbean area on 12 August 2021 at 0235 UTC.  
Source: US National Hurricane Center<sup>1</sup>

<sup>1</sup> National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, available at: [https://www.nhc.noaa.gov/tafb/CAR\\_00Z.gif](https://www.nhc.noaa.gov/tafb/CAR_00Z.gif)

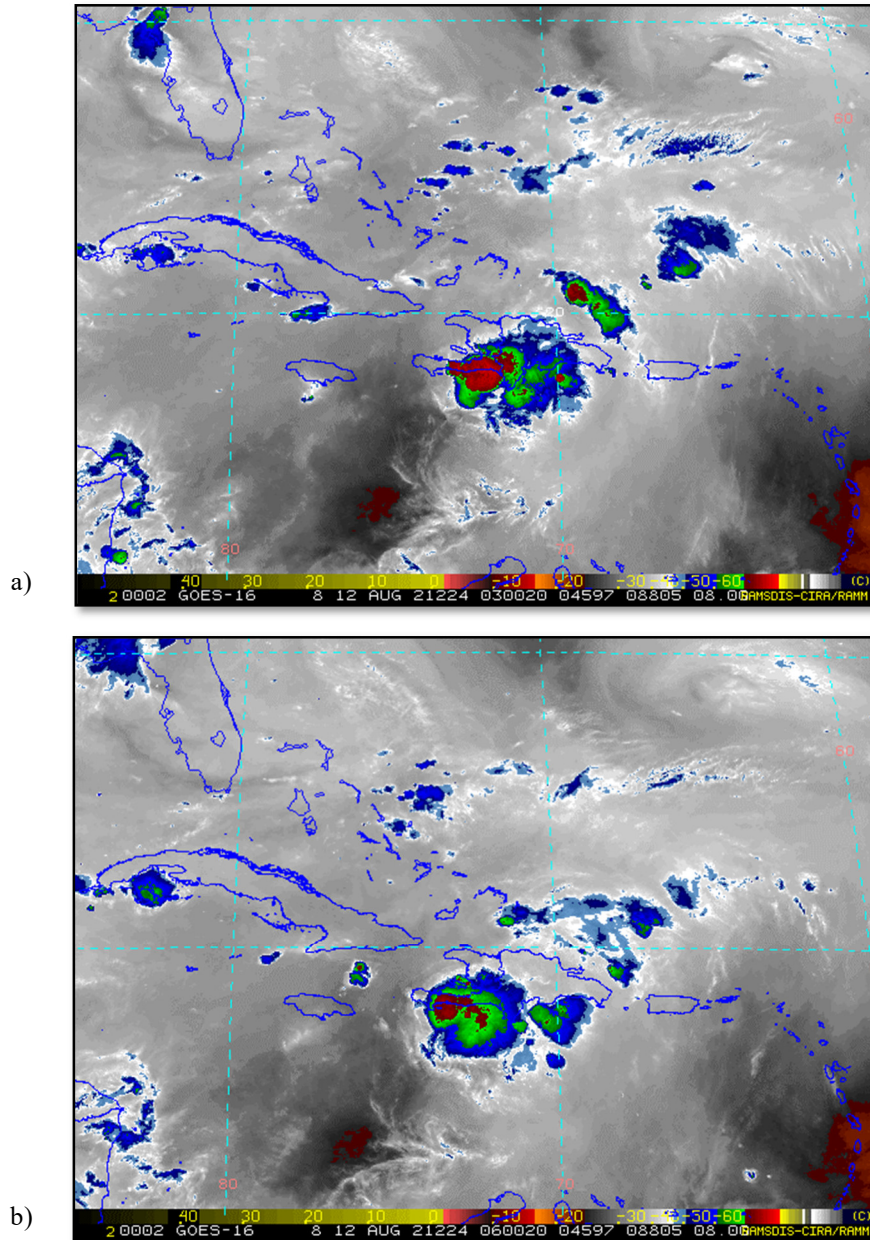


Figure 2 Satellite imagery at 0300 UTC (a) and 0600 UTC (b) on 12 August as indicated in the label from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between  $-50^{\circ}\text{C}$  and  $-70^{\circ}\text{C}$ ), while the red/yellow colours represent very high altitude clouds (top cloud lower than  $-70^{\circ}\text{C}$ ). High altitude clouds indicate strong convection associated with intense precipitation. Source: NOAA Satellite and Information Service<sup>2</sup>.

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<sup>2</sup> RAMSDIS Online Archive, NOAA Satellite and Information Service, review date: 13 August 2021, available at: [https://rammb.cira.colostate.edu/ramsdiskonline/images/rmtc/rmtcsasec4ir304/rmtcsasec4ir304\\_20210812030020.gif](https://rammb.cira.colostate.edu/ramsdiskonline/images/rmtc/rmtcsasec4ir304/rmtcsasec4ir304_20210812030020.gif)  
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### 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 Storm Fred, although it did not exceed winds greater than 39 mph (62.7 km/h), qualified as a Loss Event<sup>3</sup> for Haiti.

The wind footprint (Figure 3) and surge field are two of the outputs from the CCRIF model, which show the regions affected by Tropical Cyclone Fred in Haiti. 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 map.

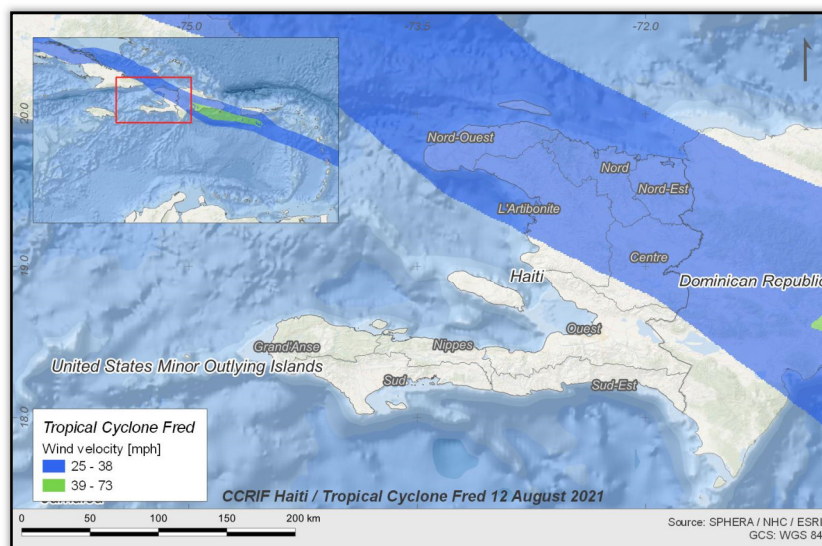


Figure 3 Map showing the wind field associated with Tropical Cyclone Fred in Haiti.  
Source: NHC & CCRIF/SPHERA

### 4 IMPACTS

Ten days after the passage of Tropical Storm Fred, no information was available on damage or loss in Haiti due to Tropical Cyclone Fred. Prior to the arrival of Tropical Storm Fred, the Directorate General of Civil Protection in collaboration with the Hydro-meteorological Unit and the Permanent Secretariat for Risk and Disaster Management activated the yellow alert due to heavy rains, thunderstorms and gusts of wind that could affect the country<sup>4</sup>. Haiti’s authorities put into effect a Tropical Storm Warning for the north coast from the Dominican Republic/Haiti border eastward and a Tropical Storm Watch from the northern border with the Dominican Republic to Gonaïves<sup>5</sup>.

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

<sup>4</sup> Haiti Libre, review date: 13 August 2021, available at: ‘[Haiti - FRED : A threat for almost the whole country](#)’

<sup>5</sup> CDEMA - Caribbean Disaster Emergency Management Agency, Information Note No. 1 (As of 11:00 AM on August 11, 2021), review date: 13 August 2021, available at: ‘[Tropical Storm Fred](#)’

## **5 CCRIF LOSS MODEL**

For Haiti, the final runs of CCRIF's loss model for wind and storm surge generated government losses, but these losses were below the attachment point of the country's tropical cyclone policy and therefore no payout under the policy is due. The Aggregated Deductible Cover (ADC) for this country's policy was not activated because there was no declaration of a Disaster alert for Haiti related to Tropical Storm Fred by ReliefWeb and therefore, no payment under the ADC is due.

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