



# **Tropical Cyclone Karen (AL122019)**

## **Fisheries Model**

### **Final Event Briefing**

#### **Grenada**

**4 October 2019**

## 1 SUMMARY

Karen was the twelfth tropical cyclone in the 2019 Atlantic Hurricane Season. On 22 September it developed as a tropical storm to the northeast of Trinidad and Tobago. On the same day, it passed over the waters between Grenada and Saint Vincent and the Grenadines at a distance of approximately 45 km from both countries. These islands were affected by tropical-storm-force winds. On the following day, Karen left the Windward Islands moving towards the northwest across the southeastern Caribbean Sea.

The COAST product for fisheries is based on a 3-tier payment scheme that considers losses caused by Adverse Weather on fisherfolk and other stakeholders in the fisheries sector (Adverse Weather component linked to Tier 1) and the assessment of direct damages caused by tropical cyclones to fishing vessels, fishing equipment and fishing infrastructure (Tropical Cyclone component linked to Tiers 2 and 3). The COAST policy thus comprises two components: Adverse Weather – based on wave height and rainfall that occurs for at least 3 consecutive days; and Tropical Cyclone – based on wind and storm surge.

This event briefing is designed to review the modelled losses calculated by CCRIF's fisheries model for both components of the COAST<sup>1</sup> policy for affected CCRIF member countries<sup>2</sup>.

## 2 INTRODUCTION

On 22 September at 0900UTC, the US National Hurricane Center (NHC) reported that the low pressure system located to the north east of Trinidad and Tobago developed as a tropical storm, and it was named Karen (Figure 1). The tropical storm presented a poorly organized and fragmented pattern of convection (as shown by the satellite image in Figure 2), with minimum central pressure of 1005 mb. The estimated centre of circulation was located at 11.9N, 60.2W, approximately 100 mi (165 km) from Grenada and approximately 120 mi (190 km) SE of Saint Vincent and the Grenadines. The maximum sustained winds were estimated at 40 mph (65 km/h) and tropical-storm-force winds extended about 125 miles (205 km) outward from the centre. The system was moving towards the west northwest along the southwestern periphery of the Bermuda-Azores high pressure system located over the Atlantic Ocean. Its forward velocity was estimated at 9 mph (15 km/h) and it was directed towards the southern Windward Islands.

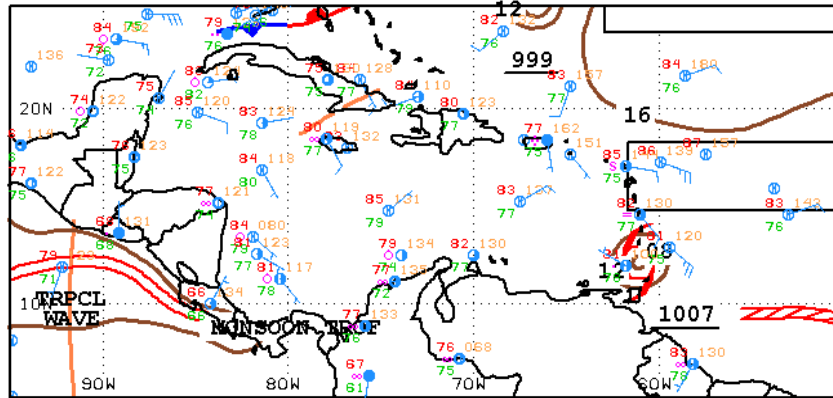
In the following hours, the intensification of the tropical storm was hindered by the presence of dry air and northeasterly wind shear and after 6 hours, at 1500UTC, the force of the tropical storm was approximately unchanged. At this time, the centre of the tropical storm was located at 12.5N 61.7W, while passed over the waters between Grenada and Saint Vincent and the Grenadines at a distance of approximately 30 mi (45 km) from both countries. Afterwards, the tropical storm left the Windward Islands, moving across the southeastern Caribbean Sea towards the northwest at the same forward velocity.

---

<sup>1</sup> Caribbean Oceans and Aquaculture Sustainability Facility

<sup>2</sup> Two CCRIF member countries have COAST policies – Grenada and Saint Lucia

The satellite-based estimates reported in Figure 3 indicated that the strongest winds were located in the northeast quadrant of Tropical Storm Karen and that Grenada and Saint Vincent and the Grenadines were invested by winds between 23 mph (37 km/h) and 40 mph (74 km/h) on 22 September from 0900UTC to 1800UTC.



12Z CARIBBEAN SURFACE ANALYSIS  
ISSUED:  
Sun Sep 22 14:42:54 UTC 2019

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

Figure 1 Surface analysis over the Caribbean area on 22 September at 1200UTC. The tropical storm is visible over the southern Windward Islands Source: US National Hurricane Center (NHC)

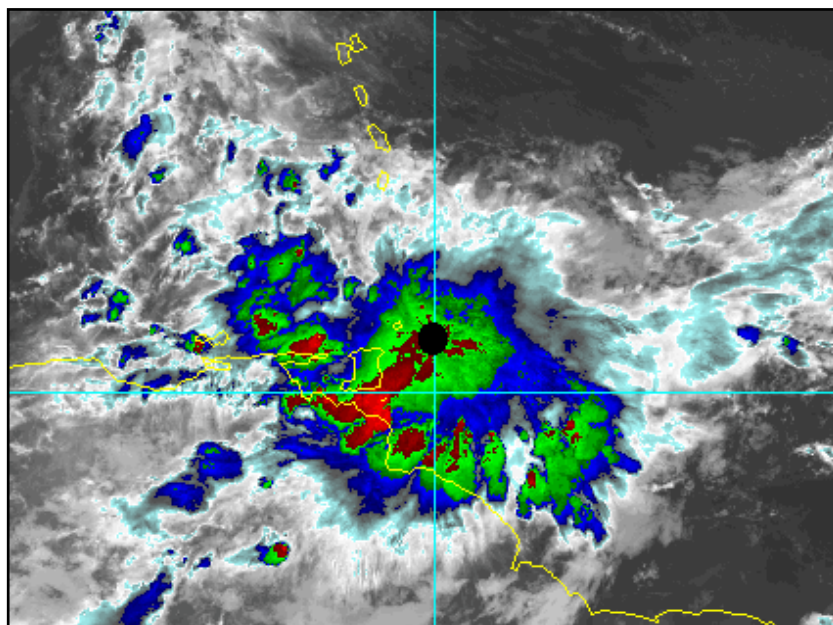


Figure 2 Satellite imagery on 22 September at 0900UTC from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between  $-50^{\circ}\text{C}$  and  $-70^{\circ}\text{C}$ ), while the red colour represents very high altitude clouds (top cloud lower than  $-70^{\circ}\text{C}$ ). High altitude clouds indicate strong convection associated with intense precipitation. The centre of tropical storm Karen is indicated by the black dot. Source: NOAA, National Environmental Satellite, Data and Information Service.

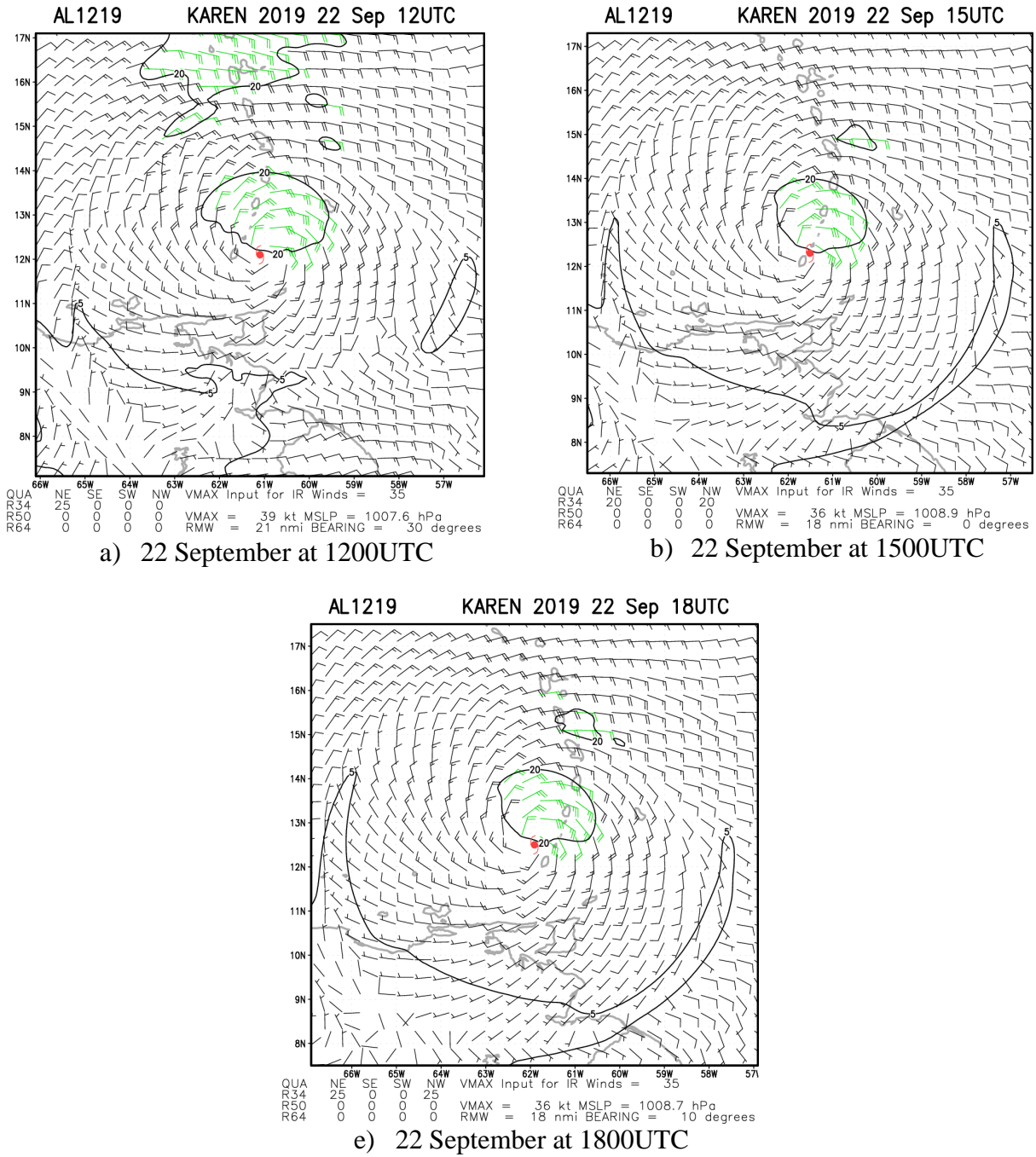


Figure 3 Multi-platform satellite surface wind analysis estimated at different times as indicated in the labels. Contouring indicates wind intensity at 20 kn (23 mph, 37 km/h) and 35 kn (40 mph, 64 km/h). Source: NOAA, National Environmental Satellite, Data and Information Service

### 3 CCRIF FISHERIES MODEL TC COMPONENT OUTPUTS

Under the Tropical Cyclone (TC) component of CCRIF's fisheries model loss calculation protocol, a report is required for any tropical cyclone affecting at least one member country with winds greater than 39 mph (62.7 km/h). For Grenada, Tropical Cyclone Karen qualified as a Loss Event<sup>3</sup> under the TC component of the country's COAST policy.

The wind footprint (Figure 4) is one of two outputs from the TC component of CCRIF's fisheries model, which show the regions affected by certain magnitudes of Tropical Cyclone Karen in Grenada.

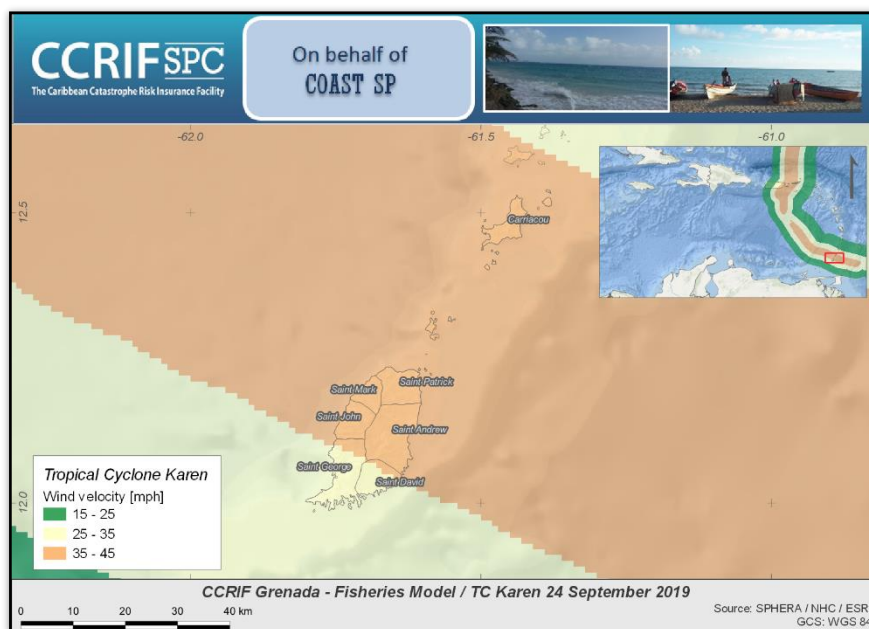


Figure 4 Map showing the wind field associated with Tropical Cyclone Karen in Grenada.  
Source: NHC & CCRIF's fisheries model TC component

### 4 CCRIF FISHERIES MODEL AW COMPONENT OUTPUTS

Under the Adverse Weather (AW) component of the CCRIF fisheries model, an adverse weather event is defined as the occurrence of a maximum 24-hour-moving-window daily rainfall over any of the exposed assets above a pre-defined threshold, or of a maximum daily significant wave height close to any of the exposed assets<sup>4</sup> above a pre-defined threshold, for at least three consecutive days. With TC Karen, these conditions did not occur, and therefore the calculation of the losses was not triggered (i.e., this event did not generate adverse weather losses).

<sup>3</sup> An event registers a loss in one or more policyholder countries but does not trigger the CCRIF policy in any policyholder country.

<sup>4</sup> If, for a given day, the value of the rainfall depth is above a rainfall threshold or the value of sea wave height is above a wave height threshold in a port or landing sites, all the revenues of the day are considered lost, i.e., the fisherfolk are unable to perform their usual activities.



Figure 5 below shows the daily time series of the country average maximum 24-hour accumulated rainfall (left) and country average maximum daily significant wave height (right). These plots show the variation of these two variables before, during and after the event. The maximum rainfall occurred on 22 September 2019, and the average value over the exposed assets was 17.0 mm. The maximum significant wave height occurred on 22 September 2019, and the average value close to the exposed assets was 2.8 m.

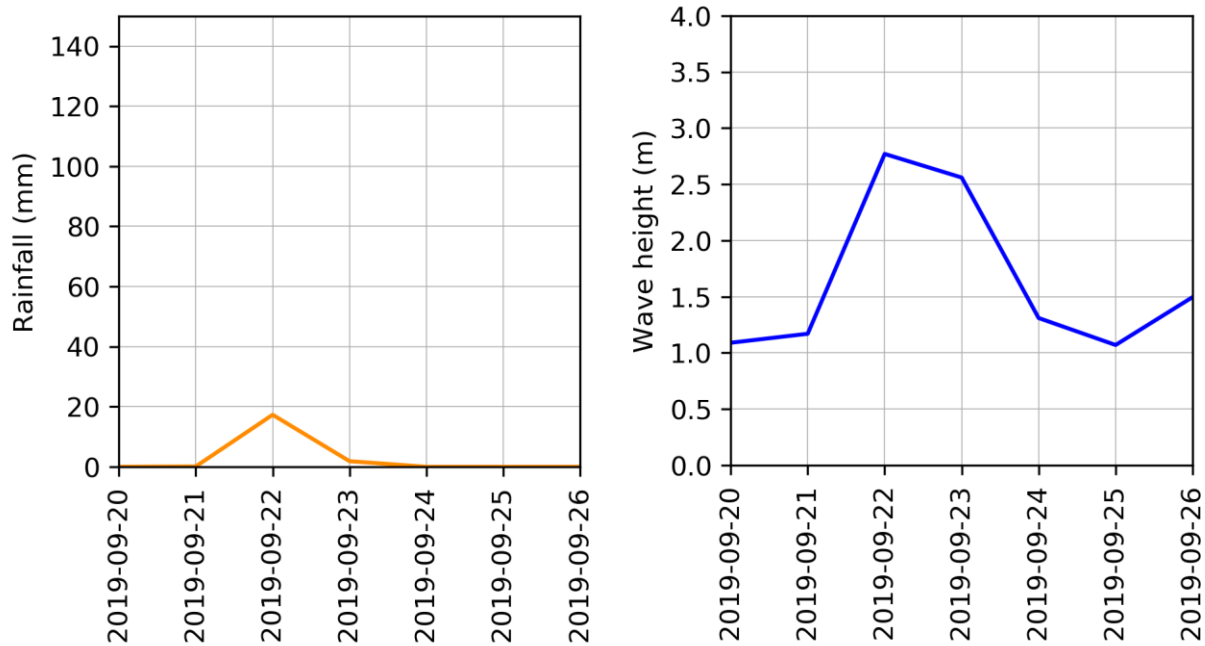


Figure 5 Daily time series of country average maximum 24-hour accumulated rainfall (left) and country average maximum daily significant wave height (right)

The model has not reported any adverse weather events since the beginning of the policy year (on July 1 2019).

## 5 IMPACTS

At the time of this report, no information was available related to damages or losses to the fisheries sector in Grenada due to Tropical Cyclone Karen. Prior to the arrival of Karen, the authorities in Grenada carried out precautionary measures such as temporarily suspending air traffic. A Tropical Storm Warning was activated.

## **6 CCRIF FISHERIES MODEL TC COMPONENT**

The modelled loss for the TC component (Tiers 2 and 3), computed for Grenada using the CCRIF fisheries model, was below the Tier 2 attachment point (and hence below the Tier 3 attachment point), therefore no payout is due under the TC component.

## **7 CCRIF FISHERIES MODEL AW COMPONENT**

The sum of the losses caused by adverse weather since the start of the policy year are below the attachment point (Tier 1) and therefore no payout is due.

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

### ***RED – Risk Engineering + Development***

Via Giuseppe Frank 38

27100 Pavia, Italy

(+39) 0382 22518

email: [cavelar@ccrif.org](mailto:cavelar@ccrif.org)