
# Tropical Cyclone Karen (AL122019)

## Wind and Storm Surge

## Event Briefing

## Windward Islands

**24 September 2019**

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# 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.

Preliminary runs of the CCRIF loss model for wind and storm surge produced government losses for Grenada and Saint Vincent and the Grenadines. In both cases, these losses were below the attachment point of these countries' Tropical Cyclone polices. Therefore, no payout under the main policy is due for these countries.

The Aggregated Deductible Cover (ADC) for these countries' policies was not activated because the modelled losses were less than 50 per cent of the attachment point and there was no disaster alert declaration for these countries from ReliefWeb related to Tropical Cyclone Karen. Therefore, no payment under the ADC is due.

The preliminary runs of the CCRIF loss model for wind and storm surge generated no government losses for Barbados and Trinidad and Tobago and therefore, under their Tropical Cyclone policies, no payouts are 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. The modelled losses due to rainfall for affected CCRIF member countries and the relationship of these losses to members' Excess Rainfall policies are described in a different event briefing.

# 2 INTRODUCTION

On 22 September at 0900UTC, the US National Hurricane Center (NHC) informed 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.

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.

At the time of writing this report, Karen had been downgraded to a tropical depression and it was forecast to pass in the vicinity of Puerto Rico and the US and British Virgin Islands.

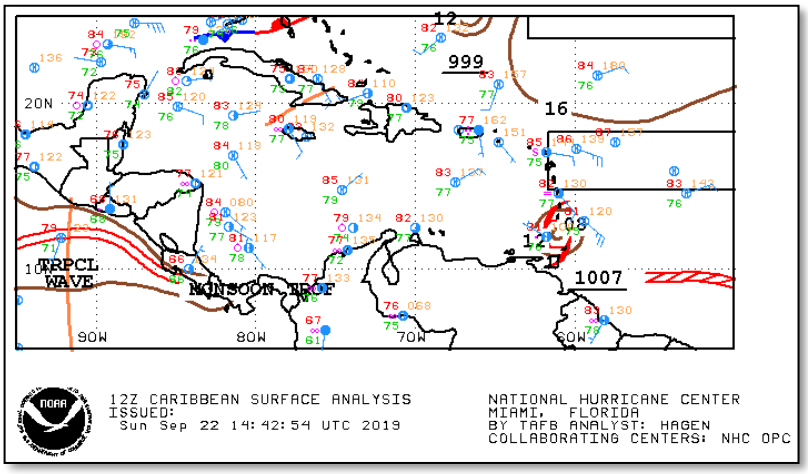



Figure 1 Surface analysis over the Caribbean area on 22 September at 1200UTC. The tropical storm is visible over the southern Windward Islands Source: US National Hurricane Center (NHC)

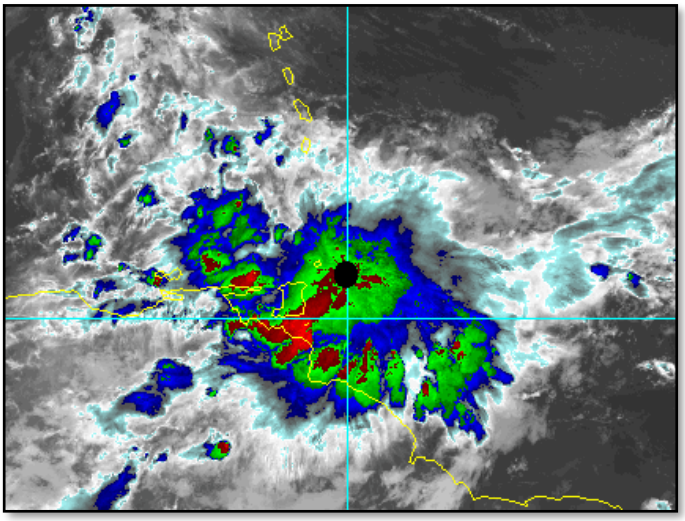
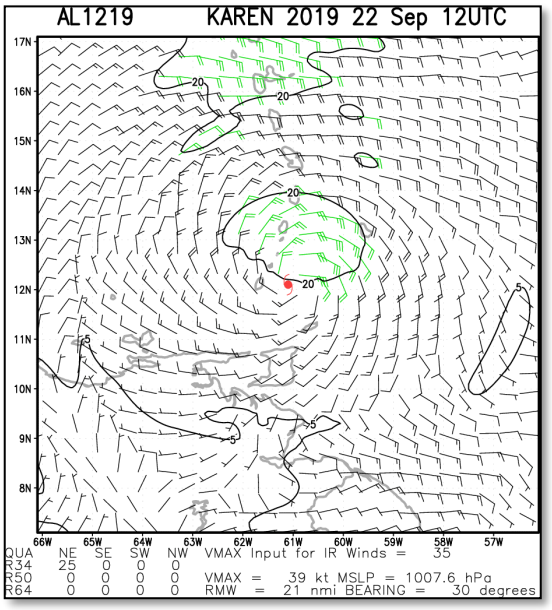
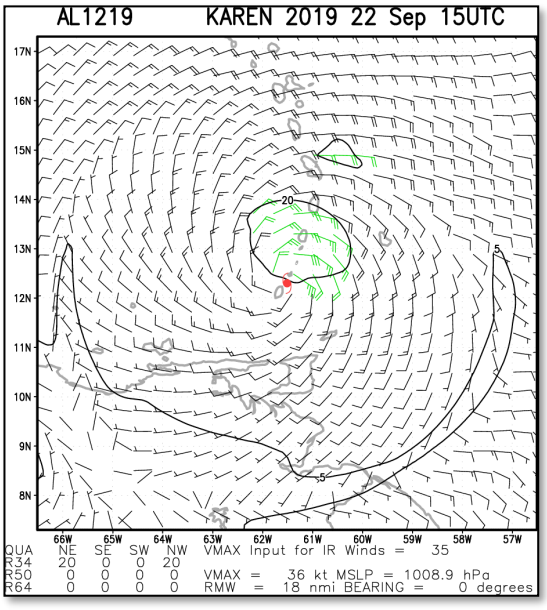


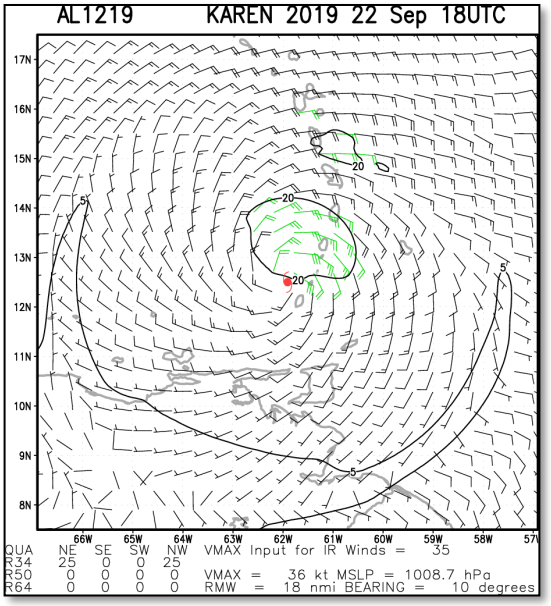
Figure 2 Satellite imagery on 22 September at 0900UTC from thermal infrared channel enhanced with colour. Blue/green colours represent high altitude clouds (top cloud temperature between -50°C and -70°C), while the red colour represents very high altitude clouds (top cloud lower than -70°C). High altitude 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.




a) 22 September at 1200UTC




b) 22 September at 1500UTC




e) 22 September at 1800UTC

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 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 Karen qualified as a Loss Event[1] for Grenada and Saint Vincent and the Grenadines.

The wind footprint (Figures 4 and 5) and surge field are two of the outputs from the CCRIF model, which show the regions affected by certain extents of Tropical Cyclone Karen in each country. Given that Karen remained only as a tropical storm, the storm surge values computed by the model were technically null values close to zero, which are too low to be represented on a hazard map.

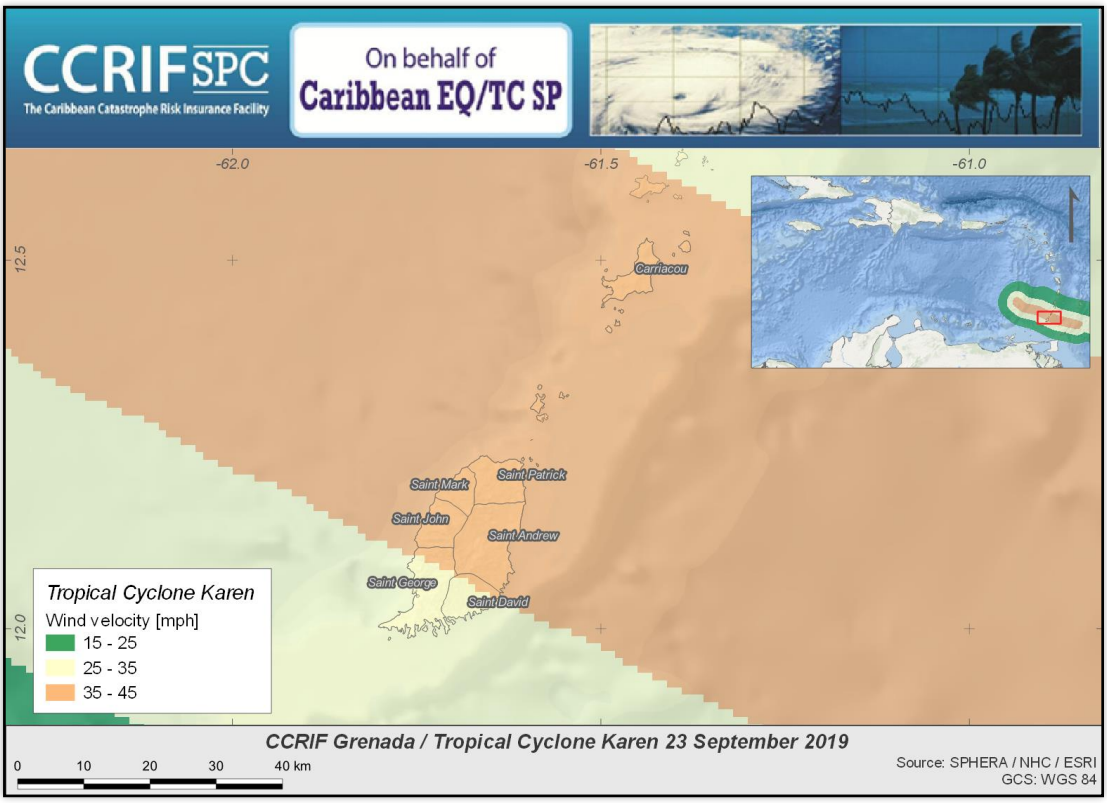



Figure 4 Map showing the wind field associated with Tropical Cyclone Karen in Grenada.
Source: NHC & CCRIF/SPHERA

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

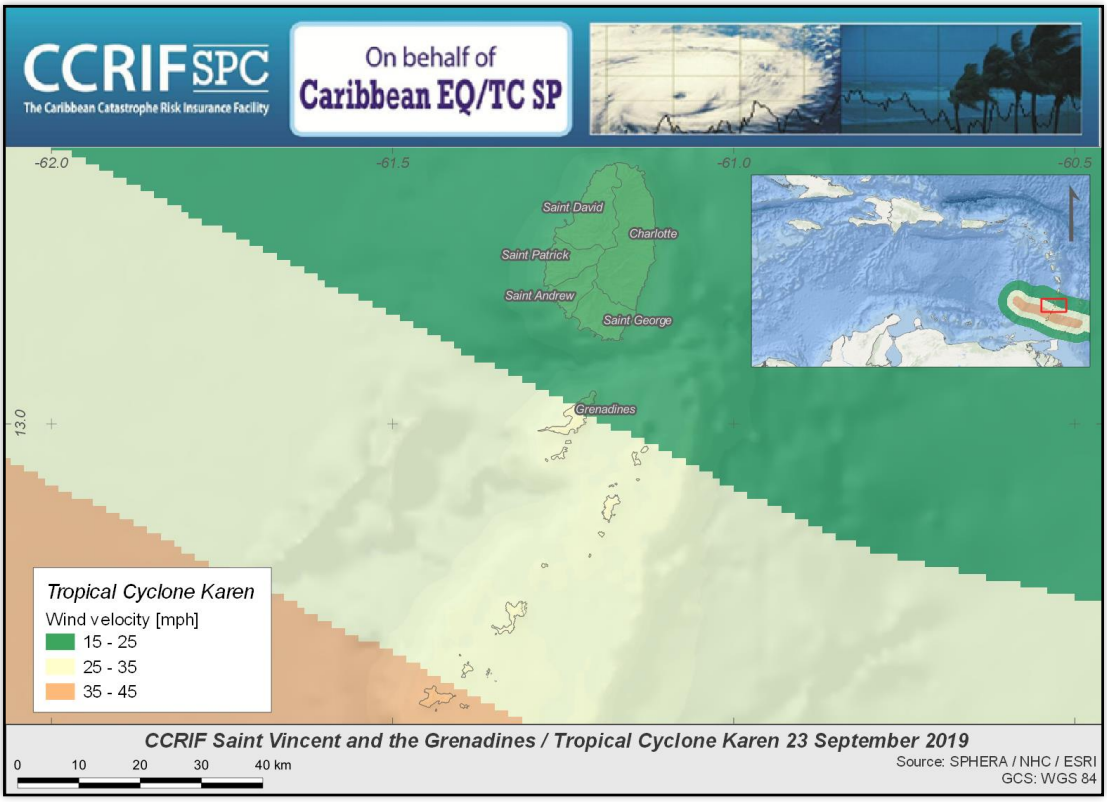



Figure 5 Map showing the wind field associated with Tropical Cyclone Karen in Saint Vincent and the Grenadines. Source: NHC & CCRIF/SPHERA

# 4 IMPACTS

## Grenada

At the time of this report, no information was available related to damage in Grenada due to Tropical Storm 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.

## Saint Vincent and the Grenadines

At the time of this report there were no reports of damage. Prior to the arrival of Tropical Cyclone Karen, the Acting Prime Minister undertook precautionary measures, including the following:

- A mandatory national shutdown was declared.
- The Emergency Operations Centre (EOC) and a Tropical Storm Watch were activated.
- Businesses and non-essential services were closed.
- All emergency shelters were activated

# 5 CCRIF LOSS MODEL

For Grenada and Saint Vincent and the Grenadines, the preliminary runs of CCRIF's loss model for wind and storm surge generated government losses, but these losses were below the attachment point for their Tropical Cyclone policies and therefore no payout under the main policy is due. The Aggregated Deductible Cover (ADC) for these countries' policies was not activated because the modelled losses were less than 50 per cent of the attachment point and there was no disaster alert declaration for Grenada and Saint Vincent and the Grenadines from ReliefWeb related to Tropical Cyclone Karen. Therefore, no payment under the ADC is due to these countries.

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

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