



Tropical Cyclone Nadine (AAL152024)

Wind and Storm Surge

Final Event Briefing

Belize

29 October 2024

1 SUMMARY

Tropical Cyclone Nadine is the fifteenth named cyclone. On 19 October 2024 at 0600 UTC, Tropical Storm Nadine formed while approaching the coast of Belize. Throughout the morning Nadine intensified, bringing tropical-storm-force conditions to coastal regions. On 19 October at 1600 UTC, Tropical Storm Nadine made landfall near Belize City. Strong winds and heavy rain swept across northern Belize, affecting the area. As Nadine moved inland towards northern Guatemala, it began to weaken and it finally dissipated on 20 October at 1800 UTC over Mexico.

The final runs of the CCRIF tropical cyclone loss model for wind and storm surge have produced government losses for Belize due to Tropical Storm Nadine (and therefore Nadine is designated as a Loss Event¹). The government losses for Belize are below the Attachment Point of its Tropical Cyclone policy and therefore no payout under this policy is due.

Conditions are not fulfilled to proceed to an Aggregate Deductible Cover (ADC)² payment on the Tropical Cyclone policy for Belize.

The Localized Damage Index (LDI) component of the TC SPHERA model did not identify this event as a localized event³ for Belize. Therefore, no payout is due under the LDI endorsement of the Tropical Cyclone policy for Belize.

This event briefing is designed to review the modelled losses due to wind and storm surge calculated by CCRIF's tropical cyclone model for affected CCRIF member countries, to be analyzed with respect to members' Tropical Cyclone policies. Belize was the only CCRIF member country for which the CCRIF loss model for wind and storm surge produced government losses due to Tropical Cyclone Nadine at the time of writing this report. A separate report on other CCRIF member countries affected by wind and storm surge, with respect to their Tropical Cyclone policies or rainfall impacts on affected CCRIF member countries will be issued if applicable.

2 INTRODUCTION

On 19 October 2024 at 0600UTC, a tropical disturbance developed into a tropical storm about 120 mi (190 km) off the coast of Belize, and it was named Nadine. Tropical Storm Nadine formed under favourable conditions, with warm sea surface temperatures of around 29°C and low atmospheric wind shear, which allowed for gradual strengthening as it moved westward.

¹ Any Tropical Cyclone event which produces a modelled loss greater than zero but lower than the policy Attachment Point (AP) in one or more policyholder countries.

² The ADC is activated if the modelled loss value is between 30% and 50% of a country's policy Attachment Point and a Disaster Alert is issued by ReliefWeb within 7 days after the event. The ADC can also be activated if the modelled loss value is between 50% of the Attachment point and the Attachment point of the country policy.

³ The LDI policy endorsement provides coverage for intense events that do not cause very large losses at a national scale but severely affect a relatively small part of a country. It is activated based on a Localized Index (LI), which compares the mean damage ratio computed for the most damaged areas and the mean damage ratio computed in the whole country. For an event to be covered by this endorsement the following conditions must be met:

- the TC local mean damage ratio computed for the local exposure must be greater than 1%
 - the TC global mean damage ratio computed for the whole country must be greater than 0.06%.
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On 19 October at 1200 UTC, Nadine was approaching Belize’s coast, with sustained winds of 45 mph (70 km/h) and gusts reaching up to 60 mph (95 km/h). The centre of the storm was located at latitude 17.3° North, longitude 87.3° West, approximately 60 miles (95 km) east of Belize City, and it was moving westward at 9 mph (15 km/h), Figure 1. Satellite imagery showed a well-organized system with curved bands surrounding the center, indicative of further intensification before landfall (Figure 2).

Nadine made landfall near Belize City at around 1600 UTC, with maximum sustained winds of 60 mph (95 km/h) and a minimum central pressure of 1002 mb. Tropical-storm-force winds affected coastal areas over northern Belize, while strong winds (but lower than tropical-storm intensity) spread over northern Belize and the Yucatán Peninsula and persisted throughout the rest of the day (Figure 3). At the time of landfall, the broad wind field of the tropical storm extended outward up to 195 miles (315 km) from the centre, primarily in the northern sector of the storm (Figure 3).

As it moved inland across Belize and northern Guatemala, Nadine gradually weakened and the system dissipated on 20 October at 1800 UTC over Mexico.

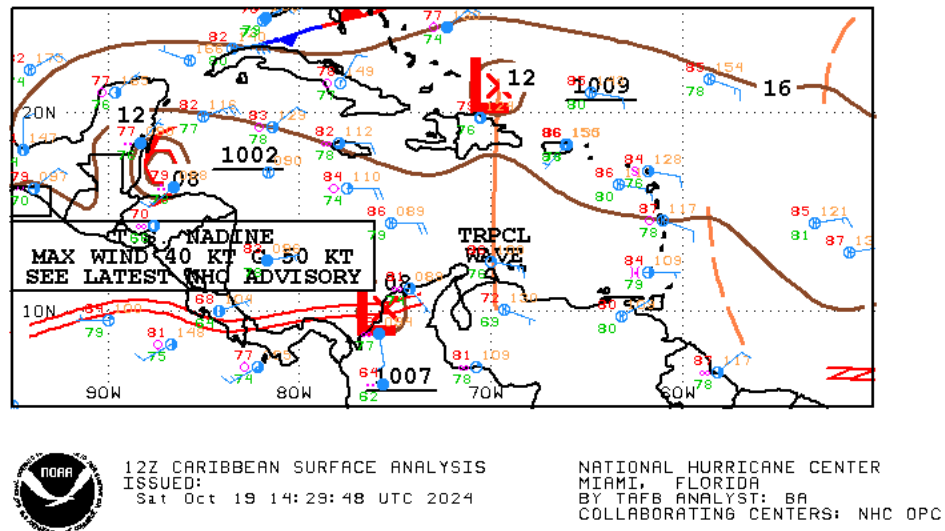


Figure 1 Satellite imagery on 19 October, 2024 at 1200 UTC from the thermal infrared channel enhanced with colour.

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, National Environmental Satellite, Data and Information Service⁴.

⁴ National Oceanic and Atmospheric Administration - FTP, National Hurricane Center, review date: 19 October 2024, available at: https://www.nhc.noaa.gov/tafb/CAR_12_Z.gif

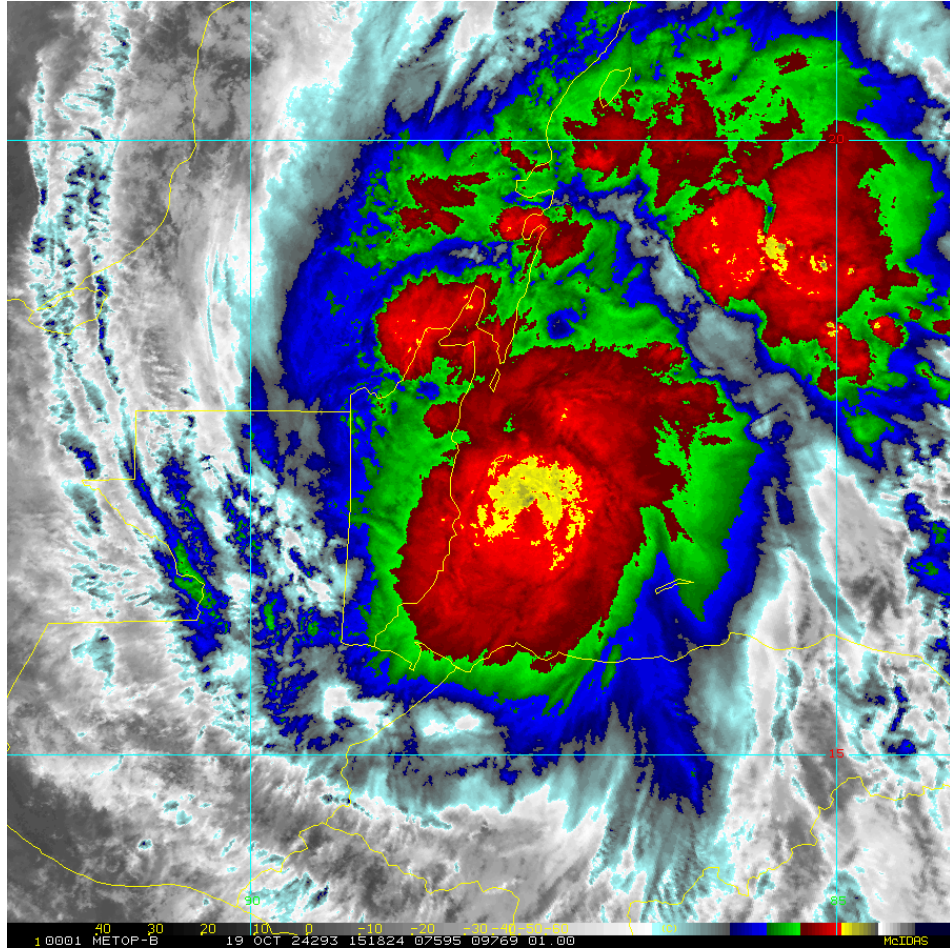


Figure 2 Surface analysis over the Caribbean area on 19 October 2024 at 1518UTC. Source: US National Hurricane Center⁵

⁵ RAMSDIS Online Archive, NOAA Satellite and Information Service, available at: https://rammb-data.cira.colostate.edu/tc_realtime/storm.asp?storm_identifier=al152024

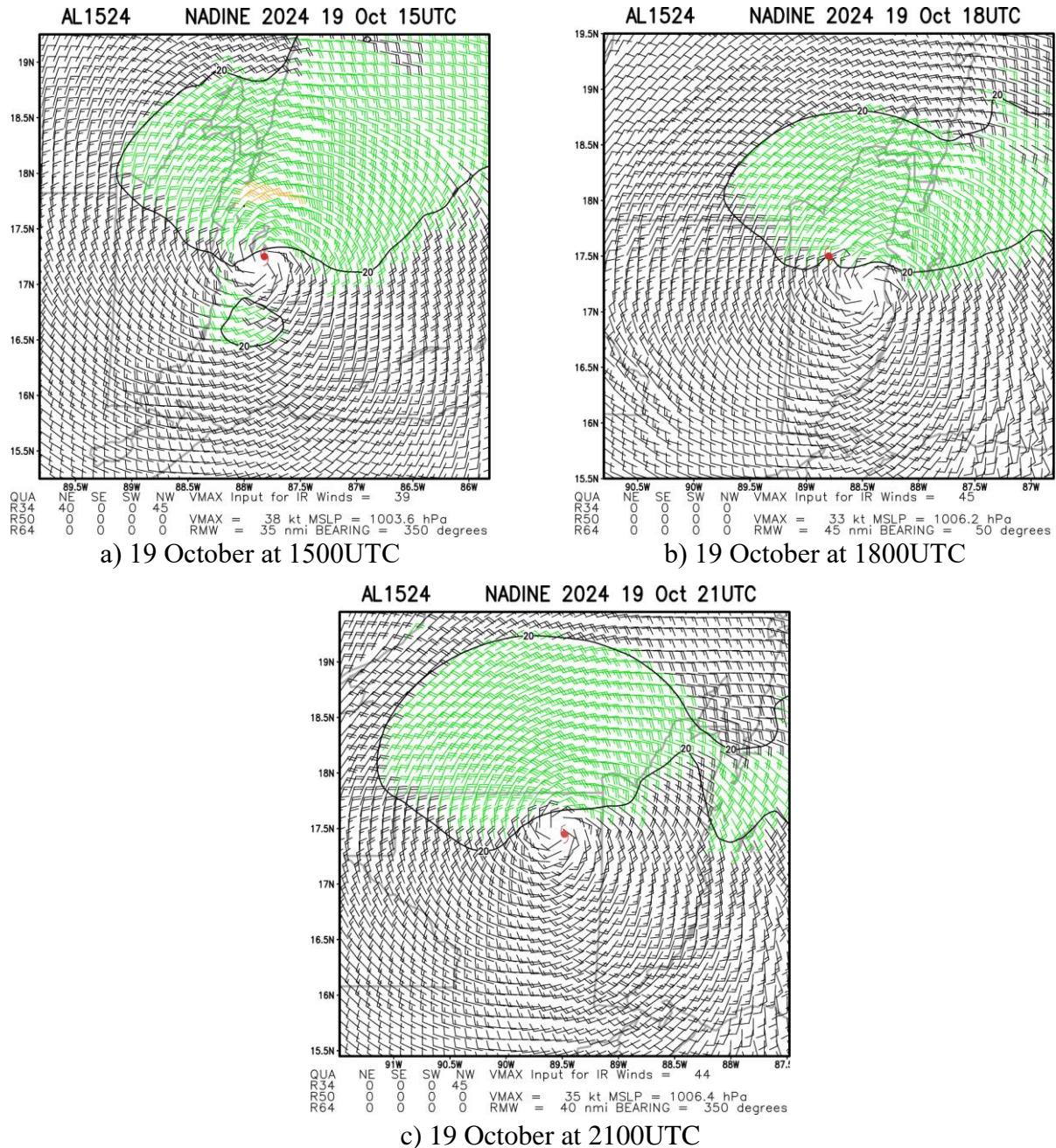


Figure 3 Multi-platform satellite based tropical cyclone surface wind analysis estimated on 19 October, 2024 at different times as indicated by the labels. Contouring indicates wind intensity at 20 kn (23 mph, 37 km/h), at 35 kn (40 mph, 65 km/h) and 50 kn (57mph, 93 km/h). Source: NOAA, National Environmental Satellite, Data and Information Service⁶

⁶ RAMSDIS Online Archive, NOAA Satellite and Information Service, available at: https://rammb-data.cira.colostate.edu/tc_realtime/storm.asp?storm_identifier=al152024

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). Belize was affected by Tropical Cyclone Nadine, which was designated by CCRIF as a Loss Event⁷.

The wind footprint is one of the outputs from CCRIF’s model. Figure 4 shows the wind footprint for the regions affected by Tropical Cyclone Nadine.



Figure 4 Map showing the wind field associated with Tropical Cyclone Nadine around Belize.
Source: NHC & CCRIF/SPHERA

4 REPORTED IMPACTS

At the time of writing this report, the available information on damages in Belize due to Tropical Storm Nadine is shown below.

On October 19, 2024, Tropical Storm Nadine moved across Belize, bringing strong winds and heavy downpours, which were more evident on Ambergris Caye, Caye Caulker and in the Corozal District. Heavy rains were reported in Belize City.

The low-lying bridge that connects San Ignacio and Santa Elena was impassable on October 19, due to the floodwaters caused by the intense rainfall from Tropical Storm Nadine.⁸

⁷ Any Tropical Cyclone event which produces a modelled loss greater than zero in one or more policyholder countries.

⁸ Channel 5 Belize: [Tropical Storm Nadine Impacts Old Capital and Western Belize - Channel 5 Belize](#)



Figure 5 Strong winds and heavy rainfall due to Tropical Storm Nadine in Belize.

5 CCRIF LOSS MODEL

The final runs of the CCRIF tropical cyclone loss model for wind and storm surge produced government losses for Belize. However, the government losses were below the Attachment Point of Belize's Tropical Cyclone policy. Therefore, no payout under this policy is due.

At the time of writing this report, ReliefWeb had not reported a Disaster Alert for any country due to this tropical cyclone⁹. The ADC policy endorsement for Belize's Tropical Cyclone policy was not activated because the modelled losses were below 30% of the Minimum Payment of the Tropical Cyclone policy. Therefore, no payment under the ADC endorsement is due for Belize.

The Localized Damage Index (LDI) component of the TC SPHERA model did not identify this event as a localized event¹⁰ for Belize. Therefore, no payout is due under the LDI endorsement of the Tropical Cyclone policy for Belize.

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

⁹ The ADC would be activated if the modelled loss value is between 30% of the Minimum Payment and 50% of a country's policy Attachment Point and a Disaster Alert is issued by ReliefWeb within 7 days after the event.

¹⁰ The LDI policy endorsement provides coverage for intense events that do not cause very large losses at a national scale but severely affect a relatively small part of a country. It is activated based on a Localized Index (LI), which compares the mean damage ratio computed for the most damaged areas and the mean damage ratio computed in the whole country. For an event to be covered by this endorsement the following conditions must be met:

- the TC local mean damage ratio computed for the local exposure must be greater than 1%
- the TC global mean damage ratio computed for the whole country must be greater than 0.06%.