CCRIF SPC
The Caribbean Catastrophe Risk Insurance Facility

Haiti

Earthquake

14 August 2021

Final Event Briefing

22 August 2021

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1 INTRODUCTION

A magnitude 7.2 earthquake occurred at 12:29:08 (UTC) on 14 August 2021, 13.5 km (8.4 mi) SSE of Petit Trou de Nippes, Haiti; 37.3 km (23.2 mi) NE of Les Cayes, Haiti and 40.9 km (25.4 mi) W of Miragoâne, Haiti. Estimates from the United States Geological Survey (USGS) located the epicentre of the event at 18.408°N, 73.480°W, and at a depth of 10.0 km (6.2 mi – Figure 1). According to the USGS the magnitude 7.2 earthquake was followed a succession of aftershocks with the following characteristics:

Event	Date - Time [UTC]	Depth [km]	Lat [°N]	Long [°W]
M5.2 - 20 km WNW of Cavaillon, Haiti *	Aug 14, 12:49	10.8	18.389	73.824
M5.1 - 10 km NW of Baradères, Haiti *	Aug 14, 16:08	10.0	18.540	73.731
M5.2 - 2 km ESE of Baradères, Haiti *	Aug 14, 17:05	7.2	18.474	73.617
M5.1 - 12 km NNE of Baradères, Haiti *	Aug 14, 18:11	10.0	18.591	73.613
M5.0 - 11 km NW of Petit Trou de Nippes, Haiti *	Aug 15, 02:37	10.0	18.600	73.581
M5.8 - 12 km NNE of Chardonnière, Haiti **	Aug 15, 03:20	12.0	18.371	74.099

* considered an aftershock of the magnitude 7.2 earthquake[1] within the CCRIF SPHERA EQ Model

** considered as an independent event within the CCRIF SPHERA EQ Model (reported separately)

Event	Hypocentral Offset Distance from M 7.2 earthquake
M5.2 - 20 km WNW of Cavaillon, Haiti	36.6 km
M5.1 - 10 km NW of Baradères, Haiti	32.2 km
M5.2 - 2 km ESE of Baradères, Haiti	20.0 km
M5.1 - 12 km NNE of Baradères, Haiti	30.0 km
M5.0 - 11 km NW of Petit Trou de Nippes, Haiti	29.5 km
M5.8 - 12 km NNE of Chardonnière, Haiti	65.3 km

[1] Earthquake event: An earthquake occurring during the Policy Period with a source moment magnitude of 5.0 or greater, in the Model Domain within a box bounded by the following – Latitude 4° and 34°N, Longitude 95° and 53°W, as reported by the Earthquake Reporting Agencies, provided that if multiple Earthquake Events occur within a specific 25 Day Period and within a radius of 50 kilometers of the location of the Earthquake Event starting the 25 Day Period, the Earthquake Event shall be the earthquake with the highest resulting Modelled Loss (EQ). The distance between two Earthquake Events shall be calculated using the formula defining Hypocentral Offset Distance.

Haiti was the only CCRIF member country where peak ground acceleration, computed with the CCRIF System for Probabilistic Hazard Evaluation and Risk Assessment (SPHERA) model, was greater than 0.01 g following the magnitude 7.2 earthquake.

Final runs of the CCRIF loss model for peak ground acceleration produced government losses for Haiti, which were above the attachment point of Haiti's earthquake policy. Final calculations show that a payout of US$39,953,272.00 is due under the policy.

Figure 1 Information from the Earthquake Hazards Program of the United States Geological Survey regarding the magnitude 7.2 earthquake event on 14 August 2021 at 12:29:08 UTC. Source: USGS[2]

2 CCRIF MODEL OUTPUTS

Under CCRIF's loss calculation protocol, a report using the CCRIF SPHERA model is produced for any earthquake with a magnitude greater than or equal to 5.0 that occurs within the region monitored by CCRIF and which generates a peak ground acceleration of at least 0.01 g in one or more grid cells of at least one CCRIF member country.

Based on the SPHERA footprint for the magnitude 7.2 earthquake, peak ground accelerations between 0.01 g and 0.46 g were estimated across Haiti. The peak ground acceleration footprint is the output from the CCRIF model, which shows the regions affected following the magnitude 7.2 earthquake (Figure 2) and the aftershocks with a source moment magnitude of 5.0 or greater (Figure 3, 4, 5, 6 and 7) in Haiti.

[2] Download Event KML, United States Geological Survey, review date: 22 August 2021, available at: *https://earthquake.usgs.gov/earthquakes/eventpage/us6000f65h/executive*

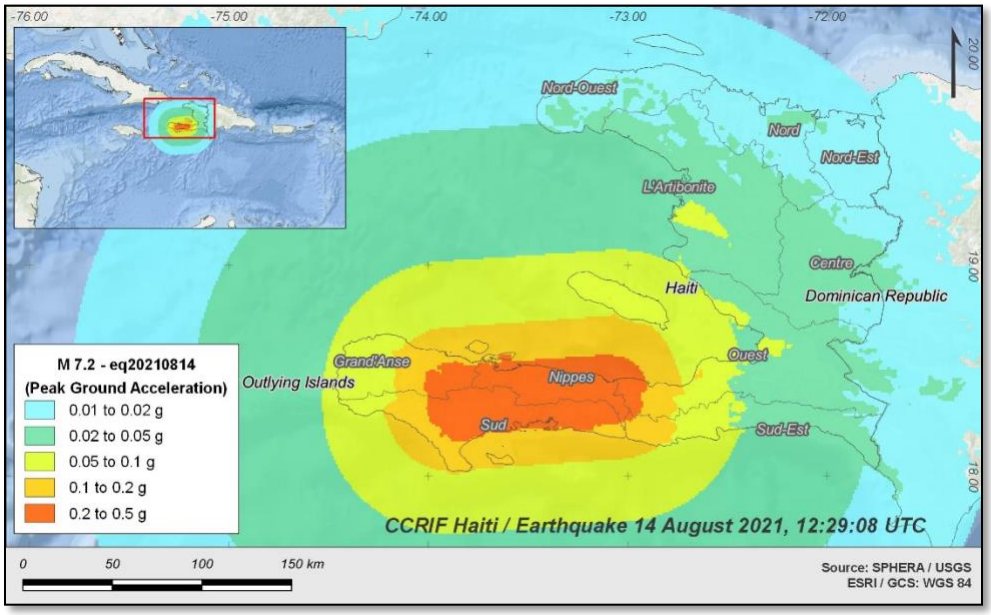

Figure 2 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the magnitude 7.2 earthquake[3] on 14 August at 12:29:08 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

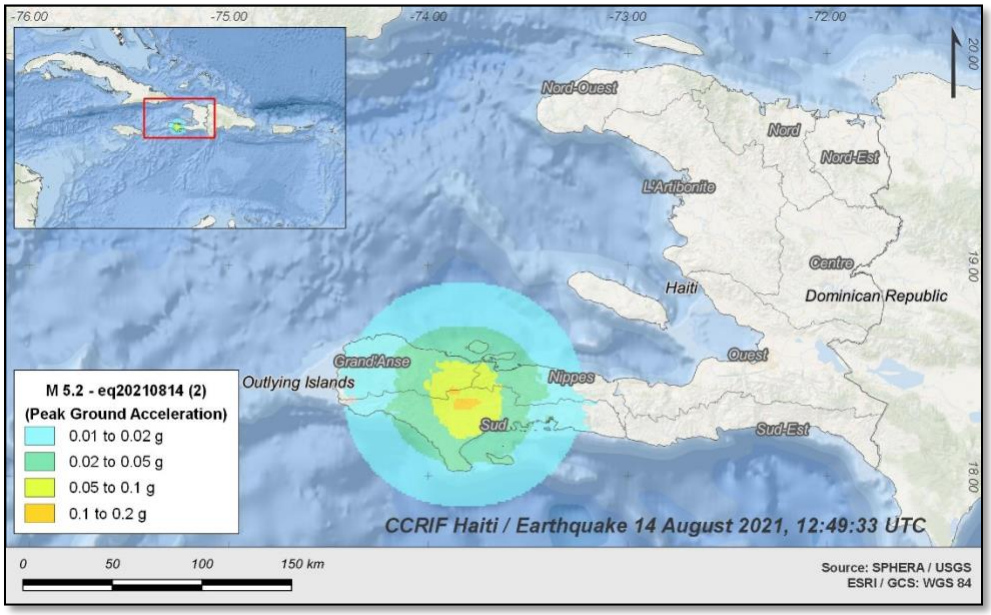

Figure 3 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the earthquake aftershock[4] of magnitude 5.2 on 14 August at 12:49:33 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

[3] USGS, review date: 22 August 2021, available at: '*M7.2 - 12 km NE of Saint-Louis du Sud, Haiti*'
[4] USGS, review date: 22 August 2021, available at: '*M5.2 - 20 km WNW of Cavaillon, Haiti*'

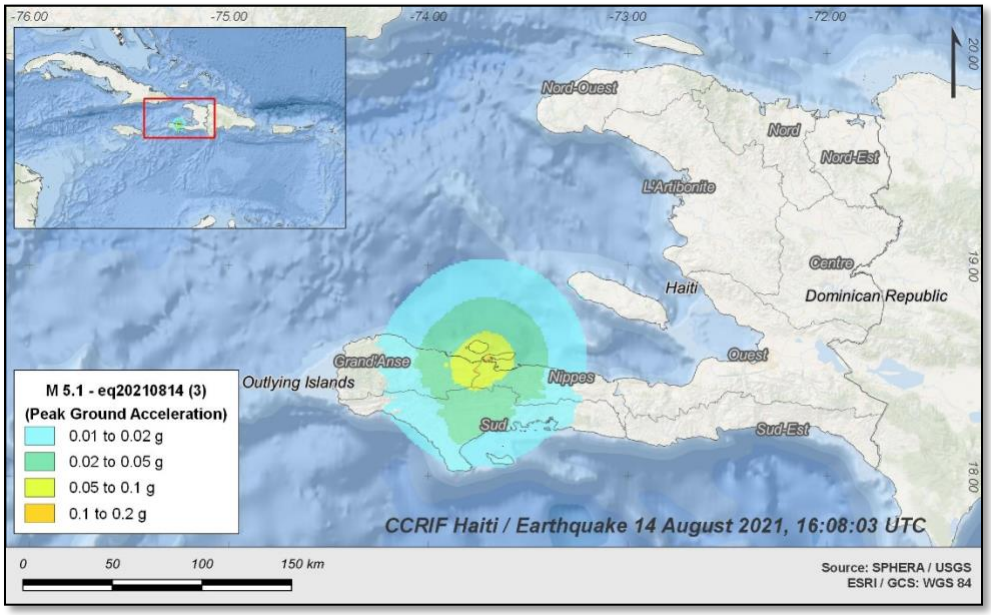

Figure 4 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the earthquake aftershock[5] of magnitude 5.1 on 14 August at 16:08:03 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

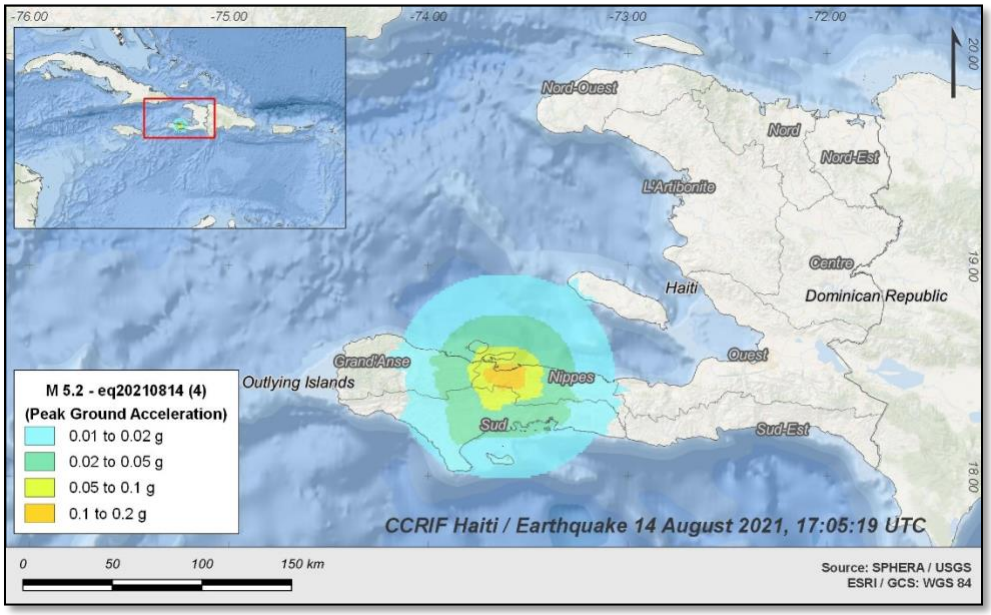

Figure 5 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the earthquake aftershock[6] of magnitude 5.2 on 14 August at 17:05:19 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

[5] USGS, review date: 22 August 2021, available at: '*M5.1 - 10 km NW of Baradères, Haiti*'
[6] USGS, review date: 22 August 2021, available at: '*M5.2 - 2 km ESE of Baradères, Haiti*'

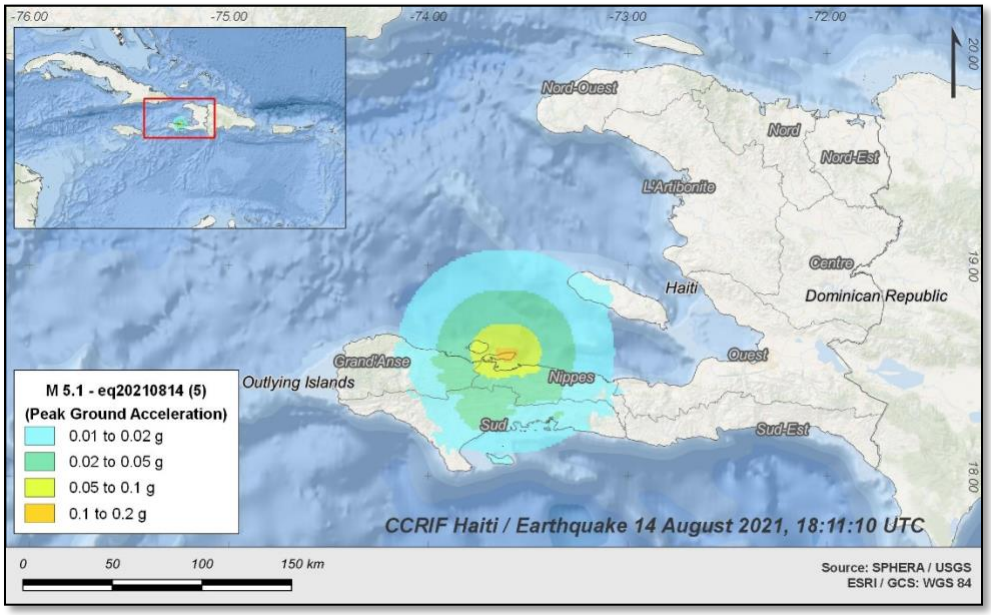

Figure 6 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the earthquake aftershock[7] of magnitude 5.1 on 14 August at 18:11:10 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

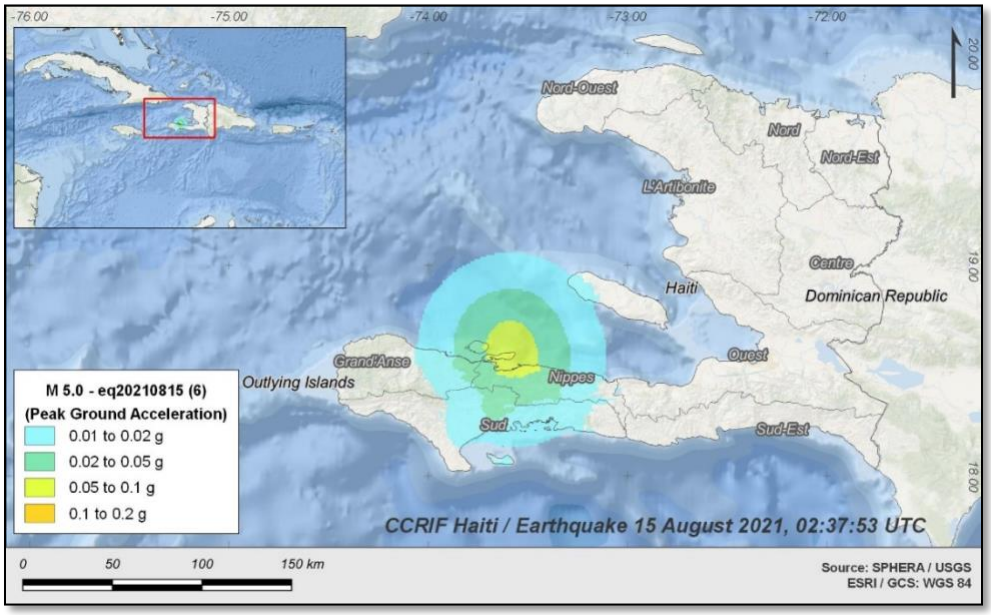

Figure 7 Map showing the peak ground acceleration in Haiti computed using SPHERA model following the earthquake aftershock[8] of magnitude 5.0 on 15 August at 02:37:53 UTC.
Source: *USGS & CCRIF SPHERA EQ Model*.

[7] USGS, review date: 22 August 2021, available at: '*M5.1 - 12 km NNE of Baradères, Haiti*'
[8] USGS, review date: 22 August 2021, available at: '*M5.0 - 11 km NW of Petit Trou de Nippes, Haiti*'

3 IMPACTS

According to the assessments provided by Haiti's Civil Protection Department (DGPC) all geographical departments of Haiti felt the powerful earthquake. The most catastrophic and widespread damage following the earthquake was reported along the Haiti's southern peninsula, which includes the Grande'Anse, Nippes, and South departments. In Les Cayes, Jeremie, Anse à Veaux, Aquin, Cavaillon and Baradères, severe damage to structures, homes and roads were observed. Figure 8 shows the most affected departments.

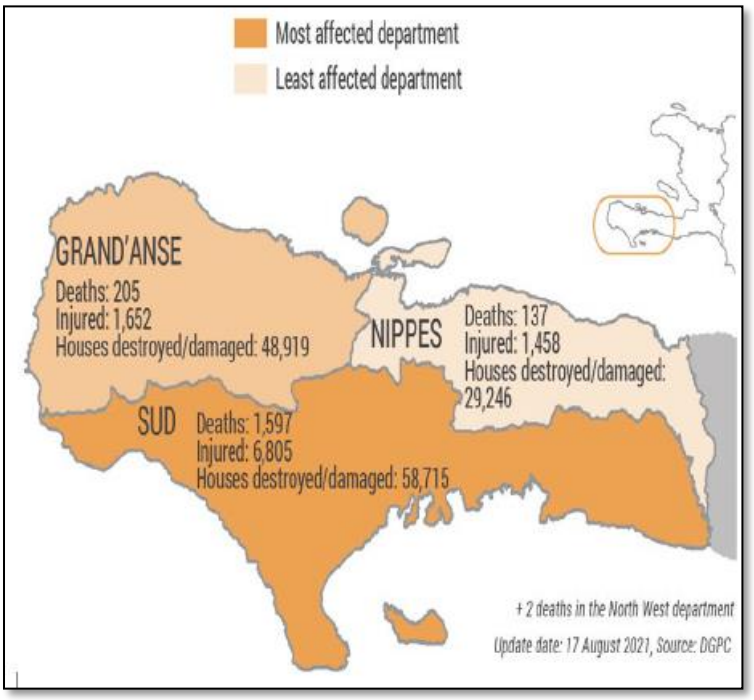

Figure 8 Map showing the most affected departments associated with magnitude 7.2 earthquake in Haiti. Source: DGPC[9].

Haiti's Civil Protection Department and the news media[10] [11] [12] [13], have reported the impact in Haiti as described below:

- 2,207 persons have died and at least 12,268 people have been injured, with 344 still missing[14]

[9] OCHA – United Nations Office for the Coordination of Humanitarian Affairs, Flash Update No. 3 (As of 18 August 2021), available at: '*HAITI: Earthquake*'
[10] Protection Civile Haiti, Updated 14 August 2021, available at: '*HAÏTI:TREMBLEMENT DE TERRE*'
[11] IFRC – International Federation of Red Cross and Red Crescent Societies, As of 14 August 2021, available at: '*IFRC: Urgent life-saving efforts in Haiti underway as preliminary reports confirm earthquake devastation*'
[12] Spectrum News Staff | International, Updated 16 August 2021, available at: '*Death toll of powerful earthquake in Haiti soars past 1,400*'
[13] Miyamoto International, as of 19 August 2021, available at: '*Haitian government engineers trained under USAID/BHA mobilized for damage assessments in Haiti's impacted areas*'
[14] USA TODAY NETWORK, as of 22 August 2021, available at: '*Haiti earthquake death toll rises to 2,200, more than 300 people still missing*'

- In South, Grand'Anse and Nippes departments; approximately 137,000 families have been affected
- Approximately 61,000 homes were destroyed and another 76,000 were damaged in South, Nippes and Grande'Anse –the 3 departments most affected
- 24 hospitals were affected; 20 with structural damage and 4 destroyed
- Hotels, schools, offices and churches also were destroyed or badly damaged
- Public infrastructure such as ports, bridges and roads were damaged by landslides
- Water, power and communications infrastructure were damaged; with liquefaction impacted both local and national roadways

In response to the catastrophic damage, Prime Minister, Ariel Henry, declared a one-month state of emergency in Haiti. The Government of Haiti activated the Emergency Operations Center to coordinate assessment and response activities and plans to assist affected areas[15].

Figure 9 shows some of the damage caused following the magnitude 7.2 earthquake in Haiti.

[15] USAID – The United States Agency for International Development, Fact Sheet #1 (As of 16 August 2021), available at: '*Haiti: Earthquake*'

Figure 9 Damage caused due to M7.2 earthquake in Haiti. August 2021.
Source: The New York Times, OCHA, Enfield Independent and Miyamoto International

A subsequent version of this report may be produced with updated information obtained from official reports or communications that are issued by the Government of Haiti.

4 TRIGGER POTENTIAL

Final runs of the CCRIF loss model for peak ground acceleration produced government losses for Haiti. For this country's earthquake policy, the government losses were above the attachment point. The final analysis shows that a payment of US$39,953,272.00 is due.

CCRIF expresses sympathy with the Government and people of Haiti for the loss of life and impacts on communities and infrastructure caused by this event.

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