

Haitian Earthquake, January 12, 2010



April 25, 2009

Ground Picture: Side Entrance of Church
Before the Earthquake



January 24, 2010

Ground Picture: Side Entrance of Church
After the Earthquake



Haiti Earthquake 2010

Location: Port-au-Prince, Haiti
Images Dates: Before: April 25, 2009 After: January 24, 2010
Images Sources: QuickBird, Natural Color
Inset Image: Location of Haiti and Port-au-Prince between the Enriquillo-Plaintain Garden Fault (EPGF), the Septentrional-Oriente Fault (SOF)



The Event

On January 12, 2010 a massive and catastrophic earthquake shook the small country of Haiti. The initial quake measured 7.0 M_w on the moment magnitude scale (denoted as M_w) that is used by seismologists to determine released energy. Within the next 12 days, 52 aftershocks of 4.5 M_w or higher were recorded. Official estimates recorded 222,570 people killed; 300,000 injured, and 1.3 million displaced. Also, 97,294 houses were destroyed and 188,383 were damaged.

The Epicenter

The 2010 earthquake epicenter occurred near the town of Léogâne, approximately 25 km (16 miles) west of Port-au-Prince. It was recorded at a depth of 13 km (8.1 mi) on the Enriquillo-Plaintain Garden Fault (EPGF). The Caribbean tectonic plate shifts slightly eastward each year at about 20 mm (0.79 in) along the North American plate. This shift forms a strike-slip fault. Two fault zones exist along this strike-slip line. One runs on the north side of Hispaniola and is known as the Septentrional-Oriente Fault (SOF). The other extends along the south side of the island and is the EPGF, which had been locked for 250 years and was building up stress. The rupture from this fault stretched about 65 kilometers (40 mi) long with mean slip of 1.8 m (5.9 ft).

Haiti and Port-au-Prince

Haiti and the Dominican Republic occupy the island of Hispaniola, which has a history of major earthquakes. On October 18, 1751, a large quake hit Port-au-Prince, Haiti's capital city. It was reported that "only one masonry building had not collapsed." The city was leveled again on June 3, 1770 by a 7.5 magnitude quake. Both Haiti and the Dominican Republic experienced a severe quake on May 7, 1842, which devastated several cities. On August 4, 1946, the Dominican Republic was subjected to an 8.0 magnitude quake that shook Haiti and produced a tsunami killing 1,600 people.

The United States' Central Intelligence Agency estimates Haiti's 2010 population at 9,203,083 of which 96 percent are below the age of 64. Haiti ranks as the poorest country in the Western Hemisphere and lists 149th out of the 182 countries on the United Nations' Human Development Index. Also, the United Nations' Food and Agriculture Organization describes Haiti as being "economically vulnerable." Extensive deforestation for farm land and fuel, considerable soil erosion related to slopes denuded of vegetation, and inadequate supplies of potable water plague the country's economic health. In addition to dealing with earthquakes the country frequently faces flooding and wind damage from tropical cyclones such as Tropical Storm Fay and Hurricanes Gustav, Hanna, and Ike—all occurring in 2008 and causing around 800 deaths.

According to the Institut Haitien de Statistique et d'Informatique, the city of Port-au-Prince in 2009 had a population of 897,859 and a population density of 24,912 per sq. km. (64,548 per sq. mi.). In comparison, New York City's population density is 10,238 per sq. km. (26,517 per sq. mi.). Another 1,612,080 Haitians reside

within the urban environs surrounding the city. With a history of earthquakes, poor economic conditions and a very high population density Port-au-Prince was vulnerable for a disaster.

Damage in Port-au-Prince

The two images cover an historical section of Port-au-Prince. They were acquired by DigitalGlobe's QuickBird satellite. The first image was taken before the earthquake on April 25, 2009, and the second image on January 24, 2010, twelve days after the earthquake. Haiti is 80 percent Catholic and the Cathedral, often viewed as one of the "sturdiest buildings" within the city, served as a hurricane shelter and aid distribution center. The large building laid out in the shape of a cross is the Roman Catholic Cathedral of Our Lady of the Assumption. The Cathedral, almost one hundred years old, was severely damaged. Archbishop Joseph S. Miot was killed when the roof collapsed. A comparative examination of the two images provides a visual example of the degree of damage throughout the city. An examination of the images shows that the Cathedral's roof dropped straight down into the building. Very little debris occurs outside the building. The walls may not be structurally sound. The roofs on several surrounding buildings also collapsed inward. However, the roofs on most of the buildings appear to have received little damage.

Interpretive Learning...

- 1) Describe how strike-slip line along a fault works. A physical geography text book might help.
- 2) Discuss why people in Haiti continue to live in this earthquake region after so much damage.
- 3) Identify what areas of the United States have active earthquake conditions. How many people reside in these areas?

Explore More...

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Acknowledgements:

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