THE UNIVERSITY OF THE WEST INDIES
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January 12th Haiti earthquake - Frequently Asked Questions
Jan.12.2010

The following is a list of questions and answers compiled after the Haiti Earthquake on January 12th, 2010. The Haiti Earthquake was of magnitude 7.0, caused major structural damage and resulted in thousands of deaths. If you have additional questions for this list please send us an email.

New FAQs - Added 20/01/10

Since the Haiti Earthquake there seems to be increased earthquake activity in the Caribbean area - Venezuela, Cayman Islands etc. Why is this happening? Is it normal or has the Haiti Earthquake triggered these other earthquakes?
The Caribbean, although small, is a plate in its own right and earthquakes, small and large, will occur around its boundaries as a normal part of its motion. The northern and eastern islands in the region lie close to those boundaries with the western and southern boundaries passing close to Central America and through northern South America. The occurrence of an earthquake indicates that a fault, which had been accumulating strain, reached its limit and released that energy. Big faults can accommodate larger amounts of energy before slipping than smaller faults. It is therefore unsurprising that when a big fault slips and generates a large magnitude earthquake - such as the Haiti Earthquake - that other smaller faults, which were also accumulating strain energy within the same system, reach their limit and generate earthquakes around the same time e.g. the earthquake in Cayman Islands region on January 19th. While earthquakes in general can advance or delay the timing of other earthquakes in an area, the cause of most earthquakes remains the motion of plates.

Can we expect more earthquakes in the region in coming weeks/months and if so how large might they be?
The region will continue to generate earthquakes in the weeks and months to come as it has done in the past. Earthquakes in the 3.0-3.9 magnitude range happen almost daily within the region. The larger magnitude earthquakes occur over longer time intervals. The biggest earthquakes known in the region have been greater than magnitude 8. There is, at this time, no way
to predict when such events will occur.

Where can I find information on fault lines and earthquakes in Jamaica?
The Earthquake Unit monitors earthquake activity in Jamaica as this island is outside of the Seismic Research Centre's area of responsibility.

FAQs - Compiled 13/01/10

What type of plate movement caused this earthquake?
The northern boundary of the Caribbean plate exhibits left-lateral strike-slip motion and the fault plane solution of this earthquake is consistent with that regime. The Enriquillo-Plaintain Garden fault system in southern Haiti appears to have hosted this earthquake. (Source: USGS).

Is it normal to have an earthquake of this size in the Caribbean?
Yes, it is normal to have an earthquake of this size and larger in the Caribbean. In the last three years at least three earthquakes greater than 7.0 magnitude have occurred in the Caribbean.

What is meant by a shallow earthquake?
Earthquakes that occur within the crust, which in the Caribbean is about 0-35 km thick, are described as shallow earthquakes. Shallow earthquakes are generally felt more strongly than deep earthquakes since they are closer to the surface of the earth. The Haiti Earthquake was 13km deep which is a shallow earthquake.

What does this earthquake mean for neighbouring countries like Jamaica or Puerto Rico?
Countries in the near vicinity may have felt the earthquake. For example, the quake was reportedly felt along the Eastern corridor, particularly the North East and South East coasts of Jamaica. Assessments are being conducted to determine if there has been any structural damage to buildings and infrastructure. As strain adjusts in the area following the occurrence of an earthquake of this size, seismic activity in the area is expected to be somewhat elevated for some time to come.

If the earthquake occurred near Haiti how come it was felt in Caracas, Venezuela and not in any other islands in the Eastern Caribbean?
When an earthquake occurs, the energy is released in waves of different frequencies. The effect of the high frequency waves is reduced rapidly as they travel through the crust. The shaking generated by such waves mostly affects buildings with few stories. Therefore those closer to the earthquake in low-rise buildings would be affected by these waves. Low frequency waves, on the other hand, can travel for greater distances and tall buildings respond to such waves. The report from Caracas came from someone on the 14th floor of a building. It may also be that features exist on the eastern side of the Caribbean plate that serve to lessen the energy of the waves coming from that direction reducing their effect as they pass through the region.

Are the Eastern Caribbean islands in any danger as a result of the Haiti Earthquake?
Large earthquakes can, in some cases, advance or delay the occurrence of some future earthquakes. That said the Eastern Caribbean is known to have a history of major earthquakes and the reality is that, with or without the occurrence of the Haiti earthquake, big damaging earthquakes can and will occur in the Eastern Caribbean.

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Why did the magnitude 7.0 Haiti Earthquake cause so much more damage and death than the magnitude 7.3 Martinique Earthquake (2007) which was twice as large?
Earthquake damageability depends on a number of factors as follows:

1. The magnitude of the earthquake
2. The distance of population centres from the earthquake - this is a combination of both distance across the surface of the earth and depth at which the earthquake occurred.
3. Quality of construction - poorly designed structures fare worse, i.e. are more readily damaged than structures using earthquake resistant designs.
4. Population density.
5. Site conditions - hard rock sites do not amplify earthquake waves, neither do they shake for a prolonged period once the waves have passed. Soft sites like reclaimed land, ancient lake beds, on they other hand, do both which can give rise to an inordinately high level of shaking.
Topography i.e. mountainous areas may also contribute to an amplification of earthquake waves.

While the Martinique earthquake was more than twice as large as the Haiti earthquake, and occurred at a distance of about 10 km offshore similar to the distance from Port au Prince to the Haiti earthquake, the depth was about 145 km depth, effectively putting it further away from the island. Though this is yet to be confirmed, it is possible that site characteristics may have also played a part in the level of shaking. This added to the poor quality of construction, which appears to have been generally widespread in Port au Prince, that failed in the earthquake, compounded by the very high density population, all worked together to create the scale of the disaster we witnessed. It should be noted that the intensity experienced at distances not far from Port au Prince was well below that generated in Port au Prince. Studies sure to be conducted on this event will shed more light on all the factors that came together in time and place to create this disaster.

Does the occurrence of this earthquake mean that stress has been released and so we probably won't have any big earthquakes in the region for a while?
No. In a zone that generates earthquakes, there is a system of faults of varying sizes. The distribution of faults in a seismically active area may be pictured as a pyramid with there being many small faults at the bottom of the pyramid and the number of faults scaling such that the bigger the fault the smaller the number. In the Haiti area there are fault segments that can generate earthquakes larger than magnitude 7.0 and these faults will continue to accumulate strain energy until they can absorb no more, at which time they will rupture. It is unknown, at this time, how close such faults are to their limit.

Is there a tsunami watch for the Eastern and Southern Caribbean?
An earthquake advisory with potential for tsunami generation was issued when the earthquake occurred, but was cancelled once sufficient data, that allowed the status to be assessed, had been collected.

What are some important lessons that we can learn from the Haiti Earthquake?
The most important lesson to learn is that adequate preparation for the known earthquake hazard can mean the difference between life continuing as usual, in a short time, or total disaster, with development halted for decades. The event has also highlighted the importance of proper building codes and the construction of earthquake resistant buildings in areas vulnerable to earthquakes.

Is this the largest earthquake to have occurred in the Caribbean?
The largest earthquakes generated in the Caribbean have been greater than magnitude 8.0. The largest recorded earthquake to have occurred in the Caribbean is believed to have been the El Cibao earthquake in the Dominican Republic in 1946 with aftershocks extending into 1947-48. The earthquake was of magnitude 8.1 and generated a tsunami which caused 75 deaths and rendered 20,000 homeless.

The largest earthquake to have occurred in the Eastern Caribbean (St. Kitts-Nevis to Trinidad & Tobago region) since continuous instrumental monitoring began in the region was the earthquake near Antigua on 8th October, 1974. The earthquake was of magnitude 7.5.

On 8th Feb 1843, the biggest earthquake known to have affected the Eastern Caribbean occurred. Damaging intensities were experienced from St. Maarten to Dominica. In Antigua, the English Harbour sank and in Point-a-Pitre, Guadeloupe, all masonry was destroyed in the earthquake, with an associated fire consuming wooden structures. One third of the population, estimated at 4,000-6,000 persons, perished. The event was felt as far south as Caracas and British Guiana and was even felt 2,000 km away in Washington, Vermont and Charlestown, U.S.A. This earthquake was not instrumentally recorded. The magnitude is estimated to have been in the range 8.0-8.5.

Where can I get more information on this earthquake?
The earthquake and subsequent aftershocks which occurred near Haiti on January 12th, 2010 are located in a region outside of the responsibility of the UWI Seismic Research Centre. The SRC monitors earthquakes, tsunamis and volcanoes for the English-speaking Eastern Caribbean countries and as such it is inappropriate for the Centre to provide scientific advisories and updates on this event. Information on this earthquake may be accessed from the National Earthquake Information Center.

View video of initial CBS News Report immediately following the January 12th, 2010 earthquake.