Resource from animation found at: <http://www.iris.edu/hq/inclass/search>

**Narration from the animation:**

**Hawaiian Islands: Origin of Earthquakes**

The Hawaiian Islands experience thousands of measured earthquakes every year. Shown here are only those earthquakes since 1960 with magnitude greater than three. They are coded by color according to depth. These earthquakes originate in three dominant source regions: two of those are in the volcanoes or along the volcano-ocean floor boundary. The third is deeper, in the mantle.

Shown first are those earthquakes associated with magma accumulation and movement beneath the volcanoes as the magma rises through the crust, breaking rock in the process; Changes of pressure and mass within the volcano create stress in adjacent areas, producing earthquakes on nearby faults and cracks.

Second are earthquakes occurring on faults within the volcanic edifice and at the boundary between the volcano and the ocean floor beneath it. Along the Ka‘ōiki fault zone on the Big Island, the Kīlauea side has moved down relative to the Mauna Loa side. Along the Hilina Pali, the coastal block has dropped relative to the Kīlauea block. Faults of this type are sometimes called gravity faults because they are driven by the weight of the volcanic layers. Earthquakes occurring on these faults are generally smaller than magnitude 5 unless they trigger the underlying fault between the volcano and the old ocean floor.

It is there, along the boundary between the ocean floor and the overlying volcano, that he largest earthquakes in Hawai’i's history occur. That interface lies seven to ten kilometers deep, or roughly 26,000 ft. Slip there produced the magnitude 7.9 Ka’u earthquake in 1868 and the magnitude 7.7 Kalapana earthquake in 1975.

The third general source of earthquakes in Hawai’i lies deeper, in the brittle mantle. Earthquakes there occur as the Pacific plate adjusts to changing loads and temperatures from the large volcanoes above. The magnitude 6.7 Kīholo Bay Earthquake in 2006 is an example of a mantle earthquake, originating 29 km below the surface.

These deep earthquake occur widely, though infrequently, among the other Hawaiian Islands as well. Deep earthquakes are the likely suspect for three magnitude 6 events that occurred around the islands of Moloka’i in 1870, Lāna’i in 1871, and Maui in 1938.

From our knowledge of earthquake history in Hawai’i, we can calculate the shaking or seismic hazard from large earthquakes. Warm colors, seen mostly on the Island of Hawai’i, indicate the highest seismic hazard in the state, comparable to that along the San Andreas fault zone of California. Seismic hazard decreases northwestward along the Hawaiian island chain, as shown by cooler colors, but it remains significant as far northwest as O’ahu.