Locations of Historical Earthquakes in the Pacific Ocean Region

Earthquakes and tsunamis are caused by the sudden release of strain in the crust and upper mantle. Tsunamis are generated by underwater earthquakes with magnitudes of 6.5 or greater. Earthquakes that occur in the ocean are more likely to generate tsunamis than earthquakes on land. Earthquakes induced by human action, such as mining or injection of fluids into the crust, can also generate tsunamis.

Tsunami waves can travel thousands of miles across the ocean and then reach coastal areas where they can cause significant damage. The runup of a tsunami wave is the height of the water level above the normal sea level at that location. The inundation is the distance inland that the water reaches. The impact of a tsunami can be devastating, with losses of life and property.

The figure shows the locations of historical earthquakes that have generated tsunamis. The colors indicate the depth of the earthquake, with shallower earthquakes represented by warmer colors and deeper earthquakes by cooler colors. The figure also includes photographs of tsunami impacts in Hawaii, courtesy of the Pacific Tsunami Museum in Hilo, Hawaii.

Source: Data compiled by Daniel A. Walker. Photographs courtesy of the Pacific Tsunami Museum in Hilo, Hawaii.