The process of an earthquake

Environment, Disaster

Have you ever wondered what has to happen to make the Earth quake? British engineer John Michell did. He was one of the first fathers of seismology and was also the first to correctly state what the cause of earthquakes was. In 1960, Michell noted that “ earthquakes and the waves of energy that they make are caused by shifting masses of rock, miles below the surface” in a scientific memoir (USGS, 32). In order for you to completely understand the process of an earthquake you must first understand the process of how an earthquake is measured.

An earthquake may not be able to be predicted at the moment but the intensity and magnitude of the earthquake can be measured and categorized. This is done using the Richter magnitude scale. The Richter magnitude scale was developed as a mathematical instrument to compare the size of earthquakes in 1935 by Charles Francis Richter. He was able to recognize that the seismic waves radiated by all earthquakes can provide good estimates of their magnitude (Richter). A seismograph is what is used to measure the amount of energy that an earthquake releases as well as the magnitude of the earthquake.

It is a logarithmic scale, which means that the numbers on the scale measures factors of 10, so each whole number unit represents a tenfold increase in amplitude. The energy that is measure is about 32 times greater than the next smaller whole number. Using this scale, a magnitude 5 earthquake would result in ten times the level of ground shaking as magnitude 4 earthquakes. Think of it in relation to the energy that is released by explosives. A magnitude 1 seismic wave releases as much

energy as blowing up 1 ounce of TNT, which is the equivalent of slamming a large rock onto a table.

A magnitude 8 earthquake releases as much energy as detonating 1 million tons of TNT (Richter). An earthquake measuring more than 6. 0 can cause detrimental damage (see fig. 1). The biggest quake in the world since 1900 scored a 9. 5 on the Richter scale in May of 1960. More than 2, 000 people were killed, 3, 000 injured, 2, 000, 000 were left homeless, and there was over $500 million worth of damages to southern Chili (Pararas). Whenever there is an earthquake, the layers of the earth grind past one another causing the ground all around to rumble and shake, resulting in severe damage.

The Earth is forged of four main layers: the inner core, the outer core, the mantle and the crust. The crust and the mantle are merely the skin to the earth’s surface. This skin is unlike our skin, though. It consists of many pieces that can slowly move past one another. These puzzle-like pieces are called tectonic plates. The edges of the tectonic plates are known as plate boundaries. Plate boundaries have many faults with very rough and jagged edges that can get stuck together. The majority of the world’s earthquakes occur on these faults.

When the plates continue to try to move, the edges of the plate boundaries violently unstick, resulting in the sudden release of energy in all directions. This energy becomes seismic waves, which act like ripples on a pond. The Earth shakes as these seismic waves move through it, and when the waves rip through the earth’s surface, the ground and anything on it shakes terribly (USGS, Science). This can be felt for miles away. The longest earthquake

ever recorded originated from the center of the Indian Ocean in December of 2004.

It was reported as a 9. 5 on the Richter scale after 3 months, and was measured at a whopping 800 miles, which is about the distance from Houston, Texas to Atlanta, Georgia (Longest). It created the biggest gash in the Earth's seabed ever. That same earthquake also created horrible conditions such as the Tsunami at Sumatra which caused 61 deaths, and $75 million in damages in Hawaii. There are three different types of plate boundaries; impact zones, spreading zones, and slipping zones.

Furthermore, there are two different kinds of impact zones. One type is when oceanic crust hits continental crust causing a boundary deduction to happen. With the oceanic crust being denser than the continental crust, it withdraws beneath the continental crust. The oceanic crust then melts as it goes under the continental crusts due to the friction of the crusts rubbing against one another. The pressure of the heat causes the melted rock to rise up through faults in the continental crust. This is what causes a volcano to erupt.

Another type of impact zone is where one crust is pushed upwards when two continental crusts collide. Mountain ranges are formed this way. The world's greatest land mountain range, the Himalaya-Karakorum in Asia is the spawn of two continental crusts colliding (USGS, 11). When two plates are moving apart along mid-ocean ridges, a spreading zone occurs. This is when two tectonic plates are moving away from each other and is forming a new crust from the rising magma that is released from the Earth's core.

An oceanographer at the National Oceanic and Atmospheric Administration's Seattle lab, Edward T Baker says, “ A spreading zone can be considered as a " linear volcano" with vent holes occurring at various points along its meandering crest”. (Raloff). Earth's mid-ocean ridge is one near-continuous zone of spreading seafloor. When one plate grinds past another plate it is known as a slipping zone. Slips along the faults in the crust allowstressfrom the grinding to be released. These fault slips are what cause earthquakes. Just when you might believe that an earthquake is over, you could be mistaken.

Earthquakes are capable of having aftershocks that can last several years. The New Madrid fault quake of December 16, 1811 in the United States had reported ground shaking for 24 hours. Occasional severe shaking and disruptions lasted for weeks and aftershocks were felt up until 1817 (USGS, Historic). An aftershock is a smaller earthquake that happens in the same area of the original earthquake. As the crust around the displaced fault plane adjusts to the changes that occurred, aftershocks will follow, until the Earth has settled back in place.

The final piece of the process of an earthquake is the aftermath. The aftermath is the devastation that an earthquake or any other type of disaster can leave in its wake. When the ground ruptures from the shaking caused by an earthquake, it can result in damage to bridges, dams, roads, railroad tracks, and the foundation of buildings. They can also cause landslides and avalanches as well. Another major cause of damage is when power lines are ripped down and gas lines rupture; this can most likely cause fires.

Also, soil liquefaction is very common in earthquakes. It occurs when water-saturated granular material, like sand, momentarily loses its strength and turns from a solid to a liquid. In the 1964 Alaskan earthquake soil liquefaction was the cause of many buildings and bridges sinking to the ground, gradually collapsing upon one another (Dubner). Even undersea earthquakes can create tsunamis that have the possibility to cause extreme damage along the coast. 75 million Americans are in significant danger of being a victim to an earthquake.

According to the United States Geological Survey, there have been over 2 million deaths attributed to earthquakes since 1900. The USGS pinpoints 20, 000 earthquakes a year; that is about 50 earthquakes a day (USGS, Earthquakes). In conclusion, the movement of the earth’s crust has shaped the earth for hundreds of millions of years, moving the sharp and stony edges over, under, and past one another. Sometimes the movements and the release of energy caused by an earthquake are smooth and gradual; other times, the plates stay locked together.

That is when the stockpiled energy that has been storing in between the plates grows strong enough to break apart. That is what makes the earthquake. The Richter scale can tell us the intensity and magnitude of an earthquake but cannot predict one. Works Cited " The Longest EarthQuake Ever Recorded. " World Most RSS. N. p. , 6 Sept. 2011. Web. 11 Apr. 2013. Pararas-Caryannis, George. " Index. html. " Index. html. N. p. , n. d. Web. 11 Apr. 2013. " Richter Scale. " Science in the Early Twentieth Century: An Encyclopedia. Santa Barbara: ABC-CLIO, 2005. Credo Reference. 0 June 2008. Web. 11 Apr. 2013. Raloff, Janet. " Pearson - Science News. " Pearson -

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