Big Ideas in Science: Earthquake Analysis

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SC300: Big Ideas in Science: From Methods to Mutation

Earthquake. Just merely uttering the word can strike fear into anyone who has ever experienced such a geological phenomenon. What is an earthquake? How are earthquakes distributed across the United States? How about the world? What have been some recent, devastating earthquakes? Are there ways we can predict or perhaps even prevent earthquakes? All of these are great questions, and can be researched and answered at one particularly informative online site, the usgs.gov website; USGS stands for United States Geological Survey.

Using the usgs.gov online resource, the very cause of an earthquake can be found: earthquakes are the result of slipping rock along one side of fault lines. Fault lines are the lines between where tectonic plates are pressing against one another; great forces of pressure are applied at these points. Delving further into the USGS site, it reveals the earthquake patterns and hazards across the continental United States. From the United States National Seismic Hazard Maps, earthquake hazard is represented by colors, white being the lowest hazard, to red having the highest hazard rating. There is a much higher, concentrated hazard on the west coast than anywhere else in the continental states; although, there are a few hot spots in Arkansas, Tennessee, and Illinois.

I considered myself very fortunate to live in Florida, which has one of the lowest earthquake ratings in the continental states; Florida is mostly white on the earthquake hazard map. For me personally, I would not want to live in *any* area where there are earthquakes (and definitely not the red areas). The reason is because earthquakes cannot be predicted or prevented, thus you cannot run from an earthquake. And according to the usgs.gov site, the red areas represent the highest hazards for potential earthquakes. But let us present a scenario where I was forced to move to a red location because my family needed me. I could certainly use the usgs.gov website's resources to research answers to common questions about what to do and not do in earthquake emergencies. I could also find information about earthquake preparedness and what to do after an earthquake. So I would use the USGS to become well-informed and learn how to survive an

earthquake.

The usgs.gov is not only limited to coverage of the United States. The USGS website also reports on earthquakes globally. If you were to review the distribution of earthquake patterns around the world, you would notice the majority or concentration of earthquakes happen in and around the Pacific Ocean. There is a higher concentration of earthquakes there due to the fact of increased plate tectonic movement; so much movement happens in the area, that it has become known as "The Pacific Ring of Fire". I can randomly select any region, which is now Baja California, Mexico, and the active map will automatically return the magnitude of the earthquake, in this case is 3.3. This is very useful because it allows you to gain *current* information on earthquakes and their magnitudes.

In researching for the two most recent destructive earthquakes, I was able find one that hit Haiti on 2010/01/12, killing 316,000 with a magnitude of 7.0, and a second earthquake that hit Eastern Sichuan, China on 2008/05/12, killing 87,587 people, having a magnitude of 7.9. What I am able to deduce from these geological tragedies, is that as great as science is, science cannot predict or prevent the great devastation that earthquakes have upon the planet. But this has not stopped scientists from trying to determine when the next earthquake will strike. Scientists are currently using seismograms that are produced on instruments call seismographs. These seismograms are very beneficial in collecting seismic activity around the world, which is in turn always under review and being assessed. Even before the seismograph, spring-pendulum seismometers (or pendulum seismoscopes) were used to monitor earthquakes. And, the real reason they continue to look for answers about earthquakes, is perhaps one day they will be able to stop the wide-spread devastation and considerable loss of human life, or at the very minimum, to be able to predict when and where earthquakes will strike.

If we were to talk about the differences in energy types between geological and biological,

biological energy is derived from the sun and is stored in plants. This type of energy tends to be stored and used in an almost automatic, positive manner. Whereas geological energy, is a stored form of massive amounts of energy that is released in the form of volcanoes and earthquakes, creating a negative outcome; many times having a catastrophic effect on the environment. But there are similarities as well, both types of energies are performing types of work. We as biological organisms are almost always moving, expending calories (a form of work), and the geological energy causes motion in the earth's crust where the outcome can be volcanoes or earthquakes. This motion can be considered work.

In summary, earthquakes are a massive, devastating geological force caused by shifting tectonic plates. There are currently no known methods for preventing or even predicting an earthquake. However, there are measures that anyone can take to better prepare themselves, to educate themselves, about earthquakes. There is one particular online resource that can provide invaluable information about earthquakes that happen in the United States, as well as around the world, and that site is usgs.gov. You can find information there that can literally save your life. From do's and don'ts, to earthquake preparedness, the site has compiled everything you ever wanted and needed to know about earthquakes. Where would we be without such an amazing resource?

References:

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