Earthquake Vocabulary

Aftershocks:

The What, Where, and When

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KYEM EARTHQUAKE PROGRAM

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Aftershocks are dangerous because they are usually unpredictable, can be of a large magnitude, and can cause even more damage to buildings that were damaged by the main shock.

A common earthquake question is, "What is the difference between an earthquake and an aftershock?" The answer to this can seem a little confusing. Hopefully this layman explanation will help.

What: In a cluster, the earthquake with the largest magnitude is called the *main shock*; anything before it is a *foreshock* and anything after it is an *aftershock*. A main shock will be redefined as a foreshock if a subsequent event has a larger magnitude. The larger the main shock, the larger and more numerous the aftershocks, and the longer they will continue. Large aftershocks can occur months or even years after the main shock.

The difference in magnitude between a main shock and its largest aftershock, **Båth's Law**, is typically 1.1-1.2 on the Moment magnitude scale. For example: A Magnitude 6.7 main shock would, at largest, have a Magnitude 5.5 aftershock. Furthermore, a main shock will have more small aftershocks and fewer large aftershocks, **Gutenberg-Richter law**.

Where: Aftershocks usually occur geographically near the main shock. As a rule of thumb, we call earthquakes aftershocks if they are at a distance from the main shock's fault no greater than the length of that fault.

When: An aftershock can occur over a period of weeks, months, or even years after the main shock. An earthquake large enough to cause damage will probably be followed by several felt aftershocks within the first hour. The rate of aftershocks decreases quickly according to **Omori's modified law** the second day has about 1/2 the number of aftershocks of the first day and the tenth has about 1/10 the number of the first day.

The 1811-1812 New Madrid Seismic Zone Aftershocks

For the first six hours after the initial NMSZ shock, Dec 16 1811, aftershocks were felt every six to ten minutes. It is believed that as many as 3,600 earthquakes occurred during the three-month period from December 16, 1811 to February 7, 1812 - an average of about 40 each day! Louisville engineer Jared Brooks recorded 1,874 earthquakes using pendulums set up throughout his house. His observations are one of the earliest chapters in the history of seismology. Hundreds of aftershocks followed over a period of several years with aftershocks strong enough to be felt occurring until 1817.