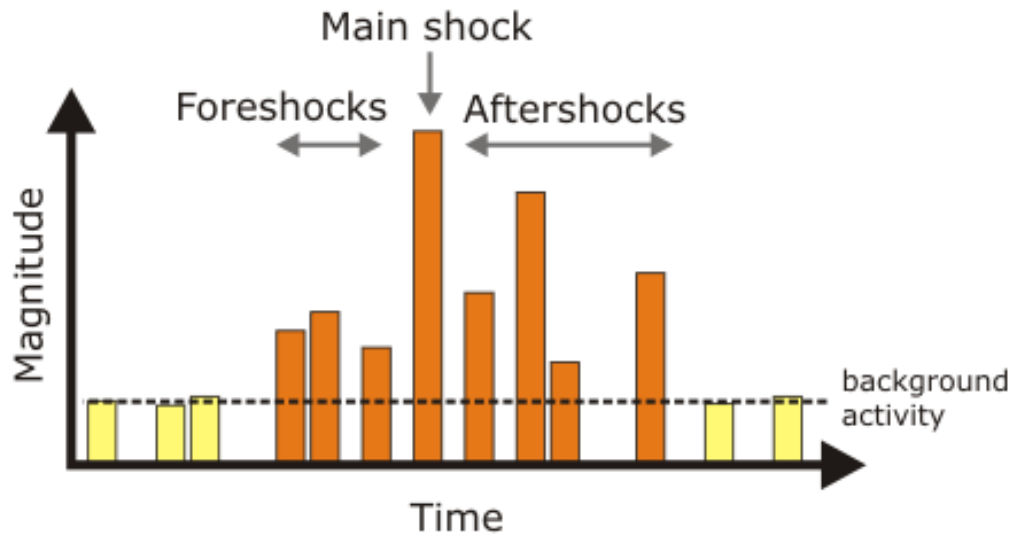


FORESHOCKS, MAINSHOCK AND AFTERSHOCKS

- A major earthquake never occurs alone.
- The mainshock, which is the earthquake with the highest magnitude, is accompanied by foreshocks and aftershocks.
- The smaller intensity shocks, which occur before the mainshock is called the foreshock.
- The fault that moves in the mainshock experiences massive redistribution of stress and this disrupted surface causes most of the aftershocks.
- The higher the magnitude of the mainshock, the larger the radius in which the aftershocks will be felt. For example, the aftershock zone of magnitude 5 earthquake will be around 5 miles while that of a magnitude 8 will be more than 200 miles.
- The quantity of aftershocks also depends on the magnitude of the mainshock. For example, a magnitude 5 aftershock will produce in a sequence 10 magnitude 4 aftershocks, 100 magnitude 3 aftershocks and 1000 magnitude 2 aftershocks and so on.

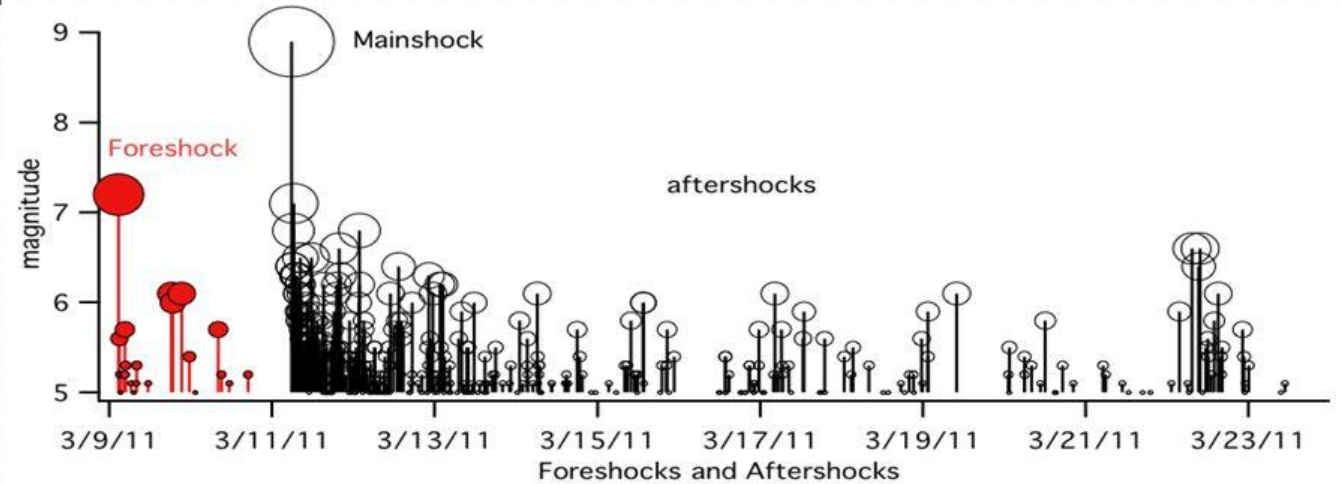
▶ Foreshocks and Aftershocks

- A **foreshock** is a small earthquake that often precedes a major earthquake.
- An **aftershock** is a small earthquake that follows the main earthquake.

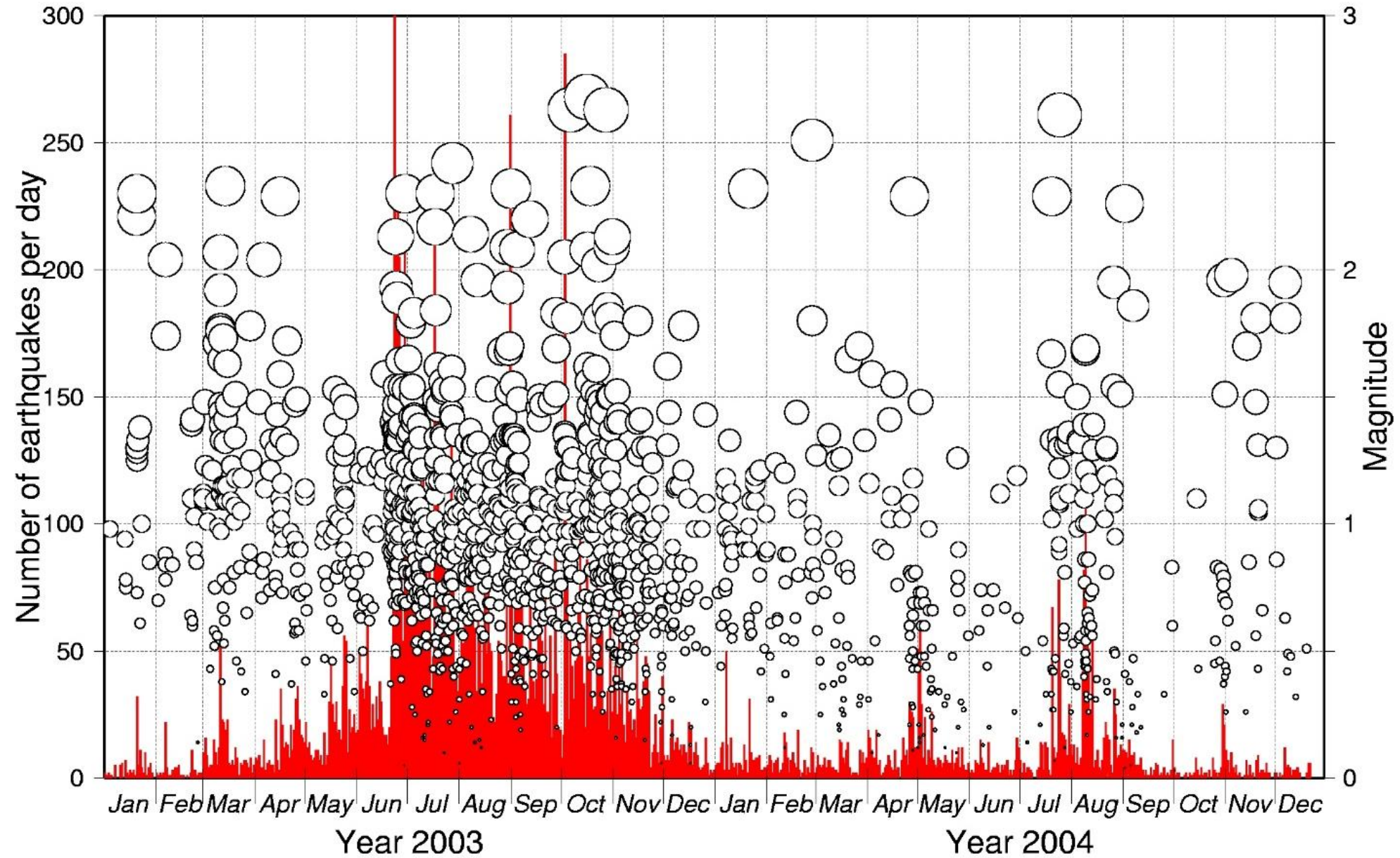


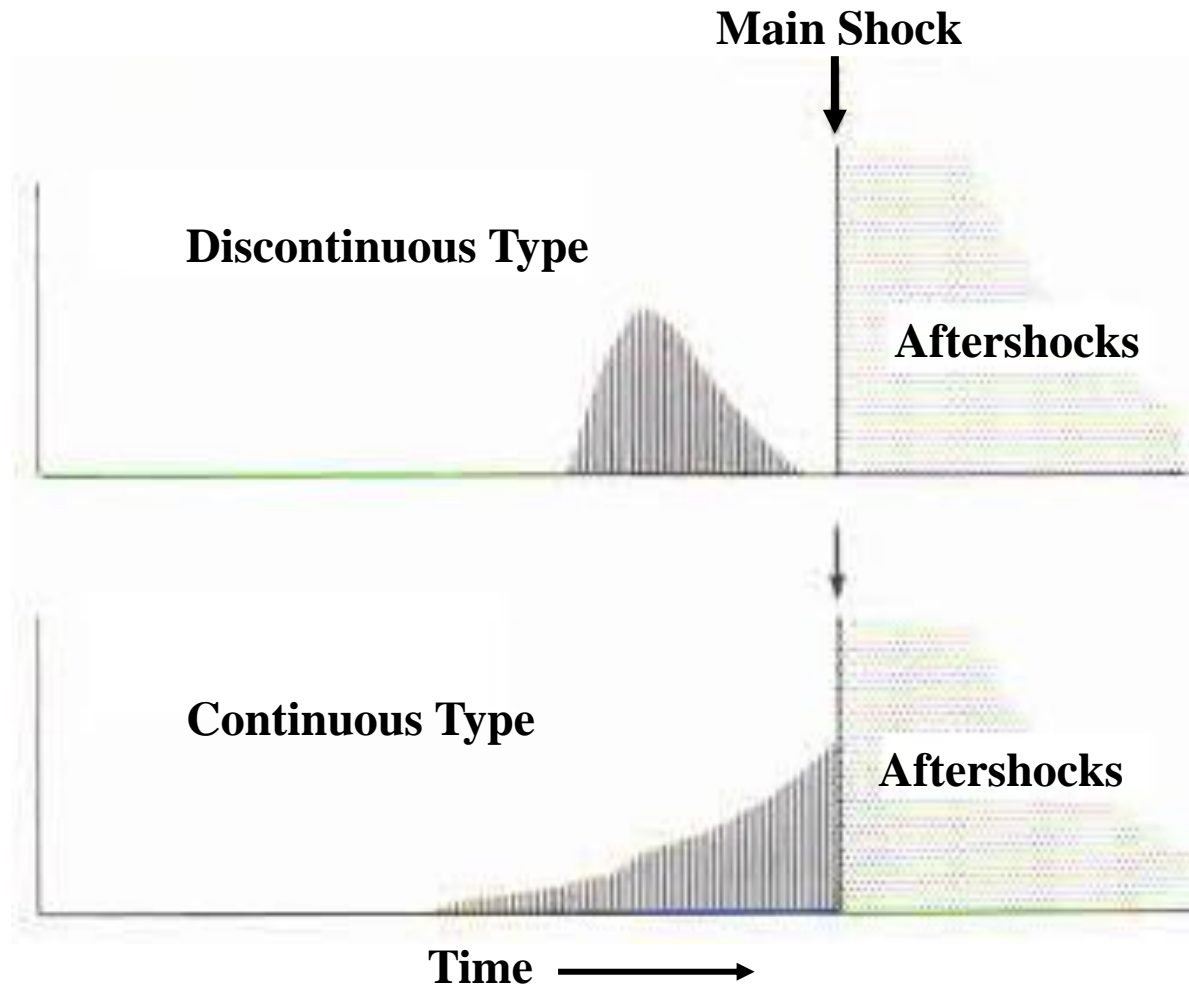
Foreshock vs. Aftershock

- **Foreshock** – small quake that comes before a major earthquake
- **Aftershock** – small quake that comes after a major earthquake



Ubaye 2003-2004 seismic swarm



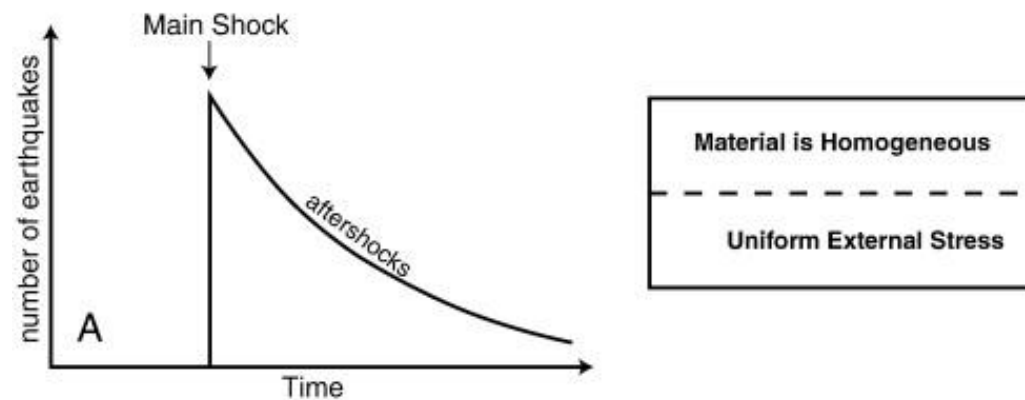


Continuous type: The frequency and magnitude of foreshocks gradually increase, leading up to the main shock.

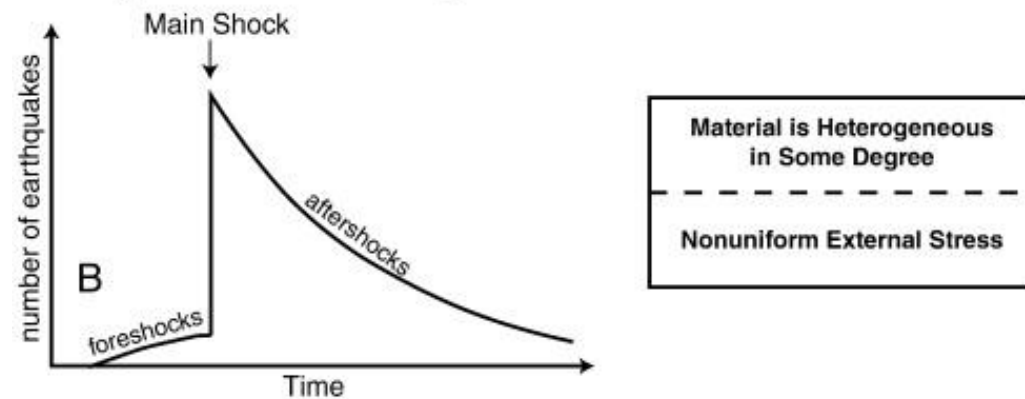
Discontinuous type: At first the frequency increases sharply, then decreases, and the main shock occurs. Large foreshocks occur particularly in the initial stage of the foreshock activity, and their activity declines markedly immediately prior the main shock.

Frequency curves (ordinate, number of earthquakes) of foreshocks in a strict sense for the two types (discontinuous and continuous) foreshocks.

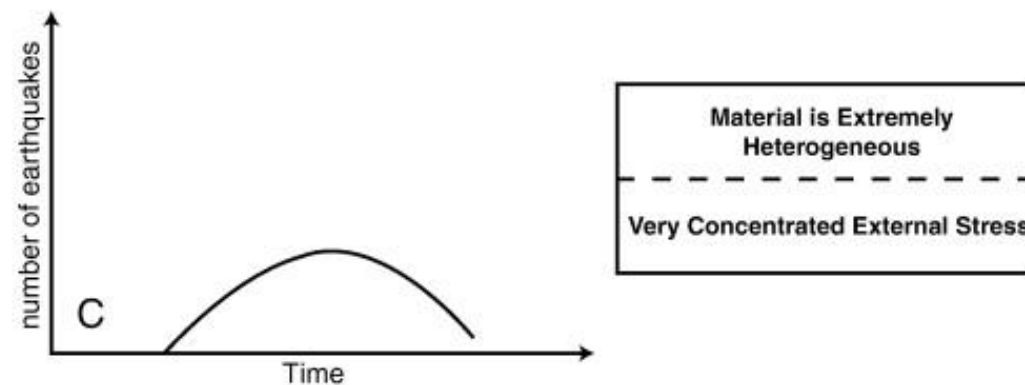
Type I: Main shock and aftershocks



Type II: Foreshocks, main shock and aftershocks



Type III: Swarm



EARTHQUAKE SEQUENCES

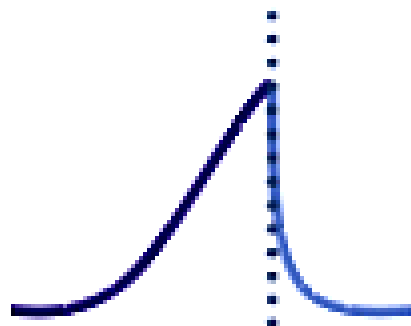


Foreshock dominant

Foreshock -loading

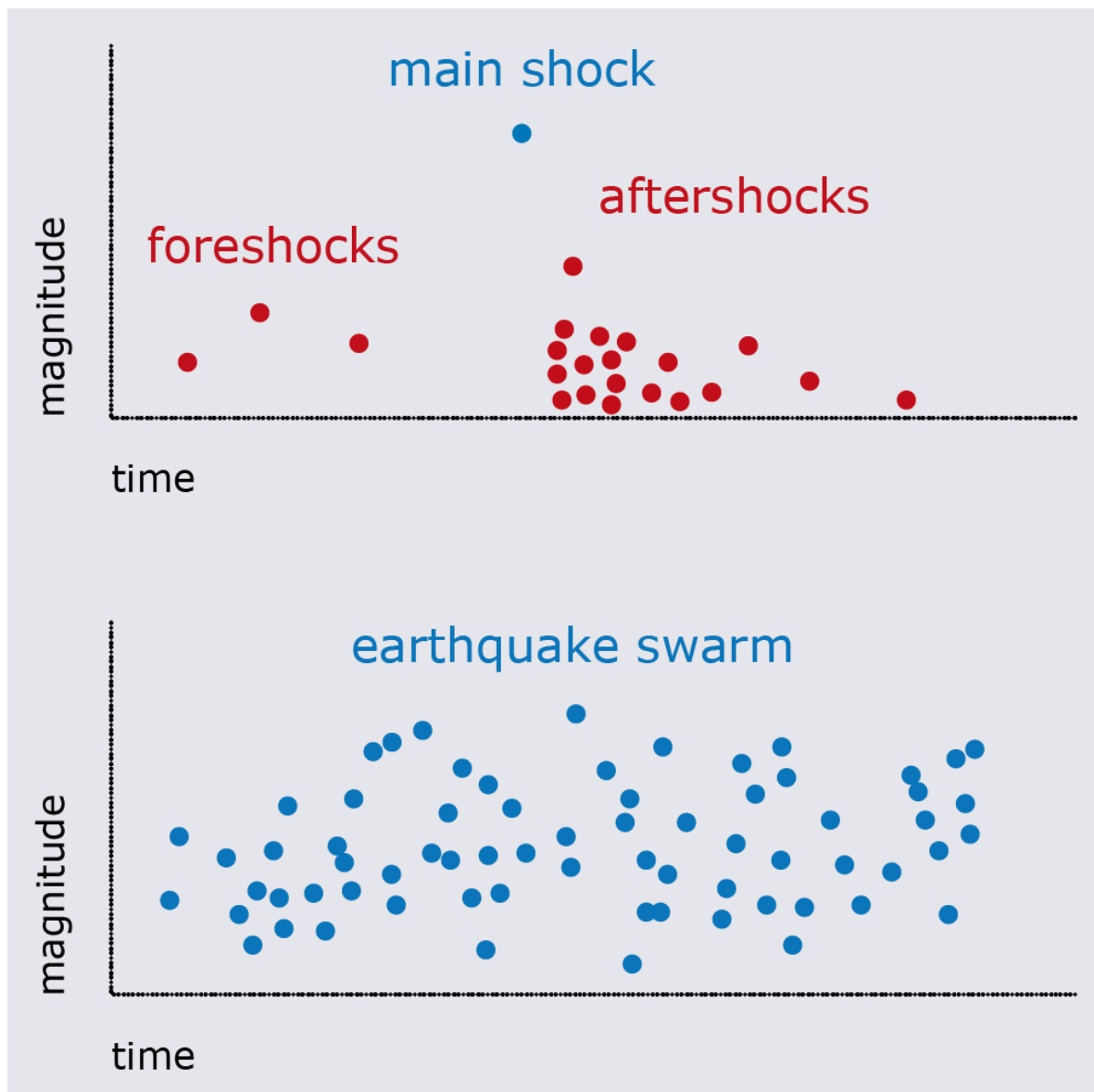
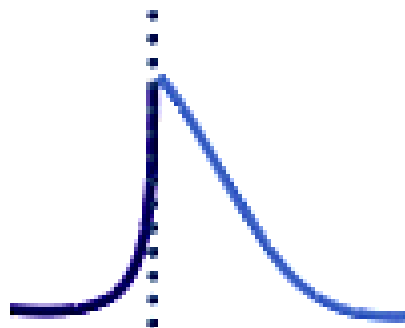
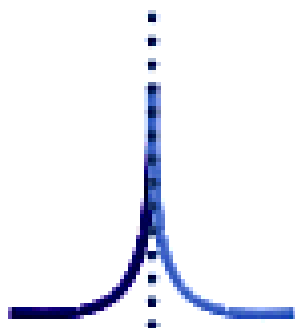
Mainshock -
accumulated damage

Aftershock -unloading



Foreshock=Aftershock

Aftershock dominant



“Foreshocks”, “mainshocks”, “aftershocks”

