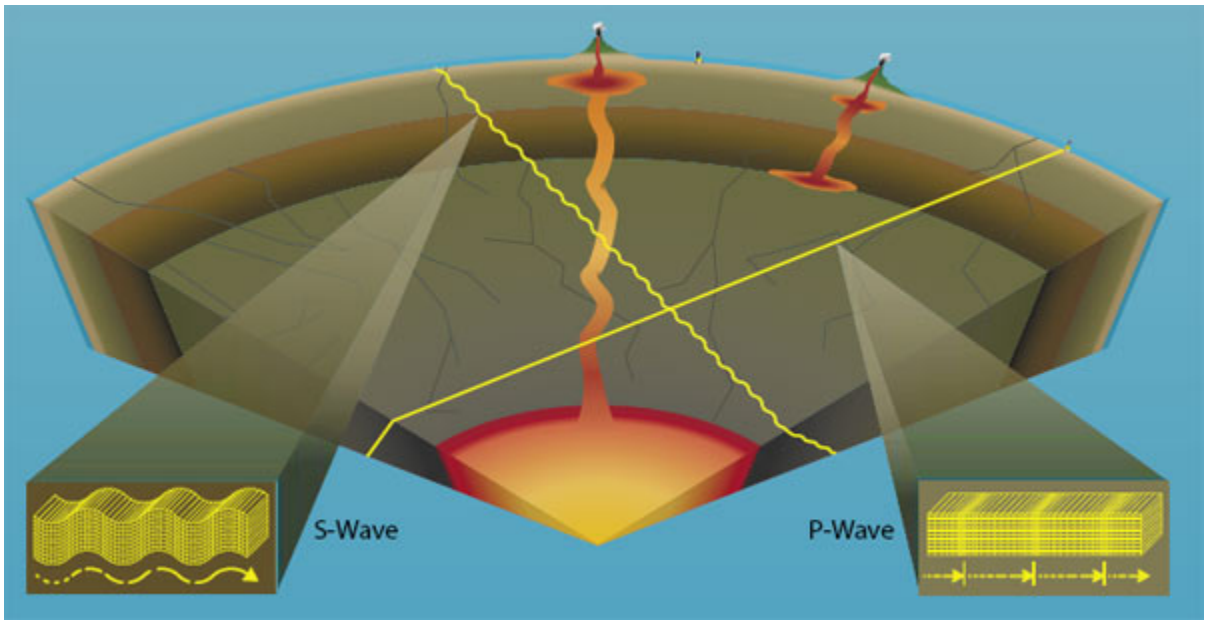
EARTHQUAKES

In general terms, an earthquake occurs usually when mechanical energy transmitted from the earth's core by the mantle is released and it reaches the solid cold crust, and tends to propagate as seismic waves similar to sound through of existing cracks or crevices known as "faults" or forming new cracks when the energy exceeds the limits of deformation and toughness of the materials that make up the lithosphere.

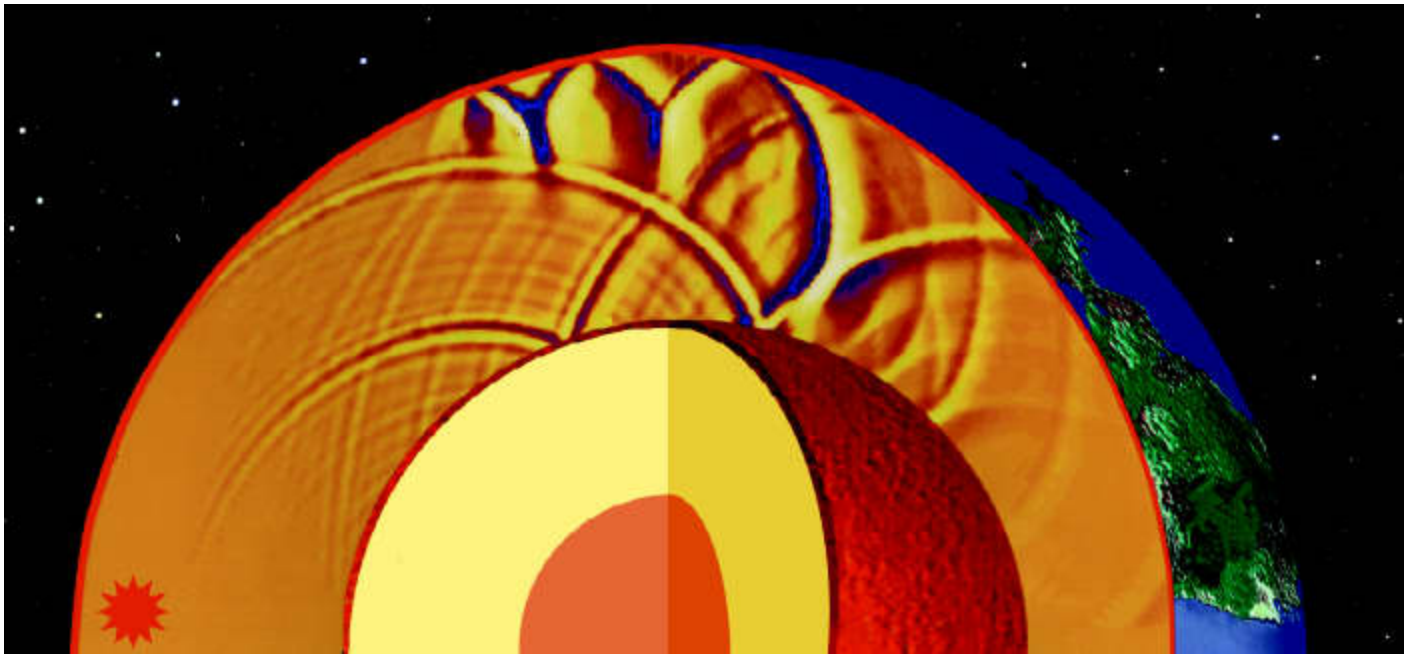


Similar to sound, seismic waves can be generated by natural and artificial movements.

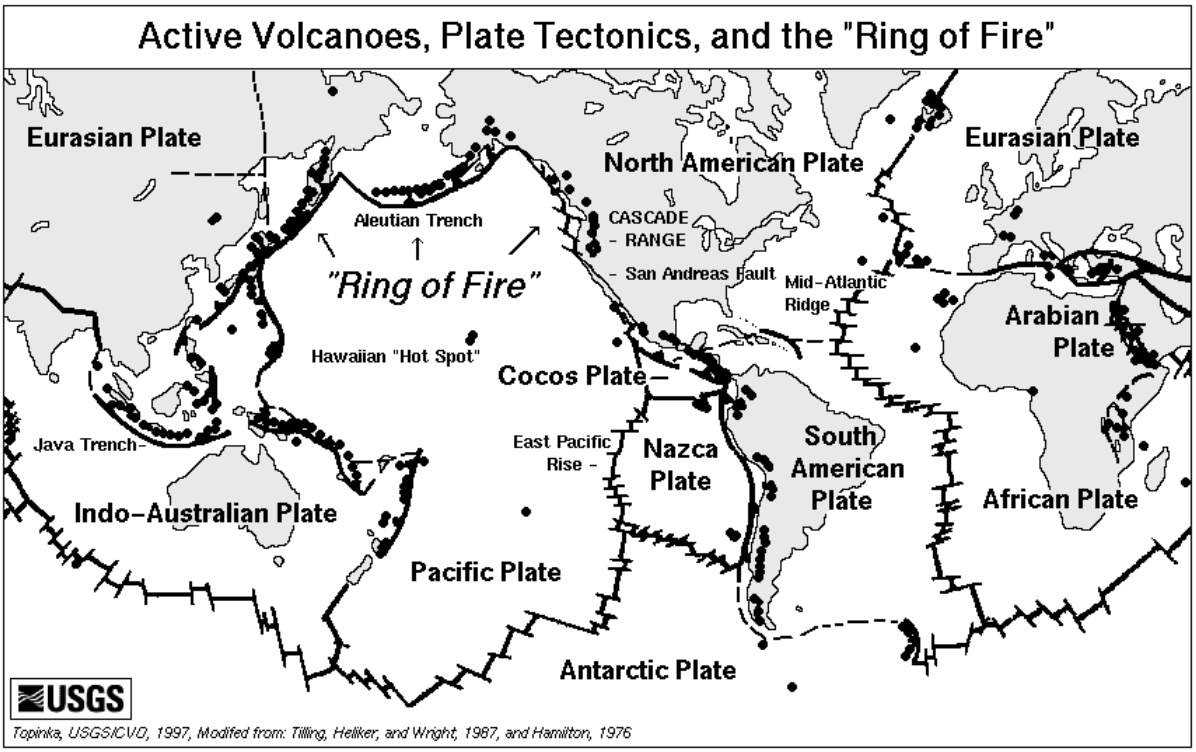
The source of a seismic wave can be detected in the area where electromagnetic energy is applied on a material or rock, usually solid.

On Earth, there is electromagnetic and heat energy that constantly spreads as kinetic energy from the core, through the mantle to reach surface regions of the lithosphere where matter is mainly composed of oxygen, silicon, calcium, magnesium and iron, becoming stiffer and less plastic and where power disturbances can occur to the natural state of matter.

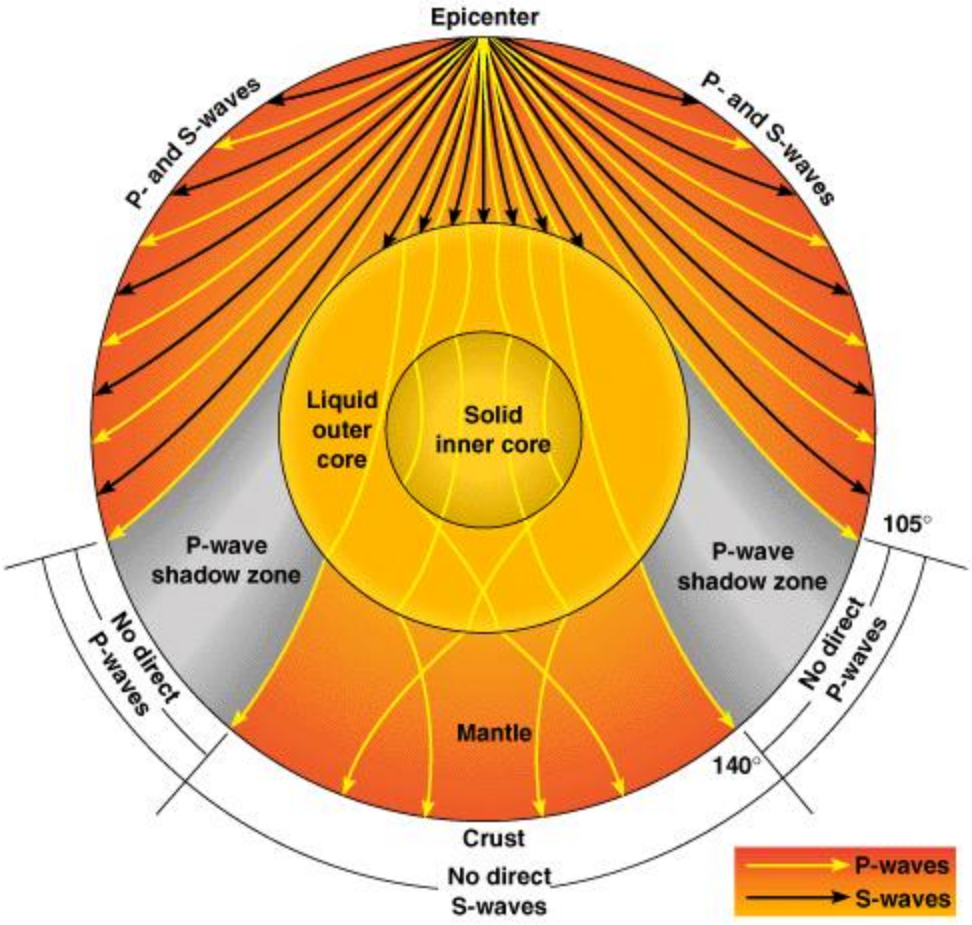
The particles of matter in the mantle will exert and receive pressure constantly, generating mechanical disturbances in the matter towards the surface with a wave behavior at different frequencies and in very different directions (depending on the chemical makeup and physical state of matter in the mantle and the lithosphere).



This mechanical energy is transmitted through the mantle, often distributing energy that will be released in areas of existing cracks and edges (faults) on the solid lithosphere of the Earth that are identified in volcanic areas.



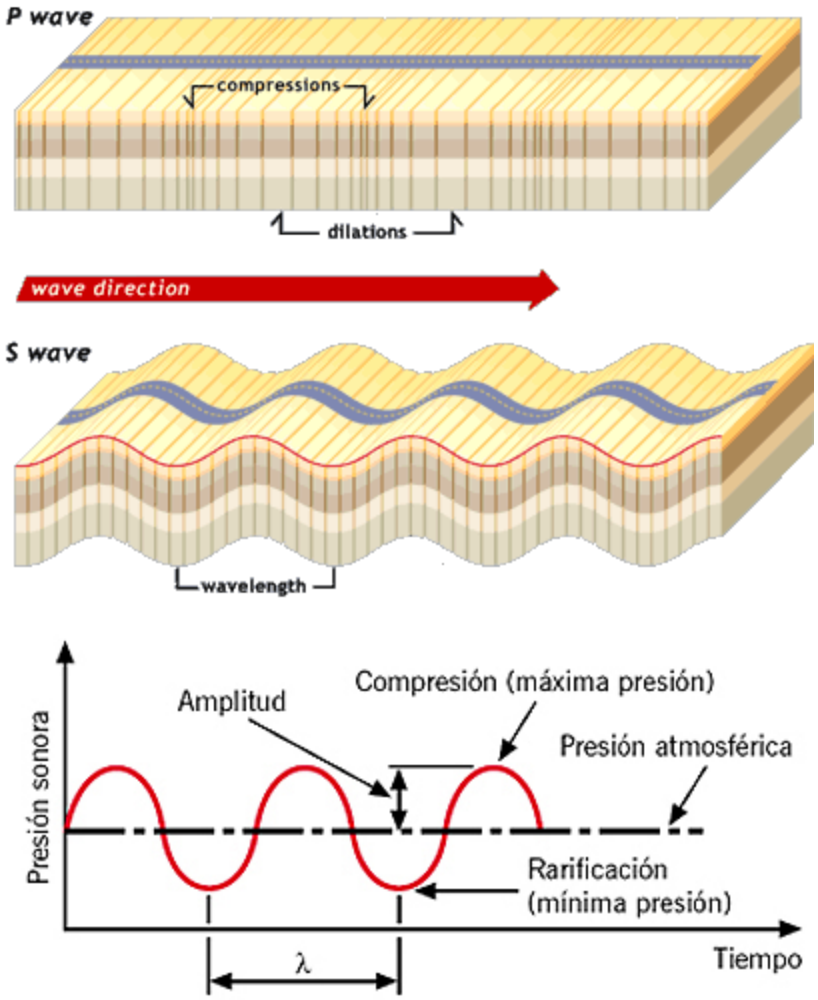
In areas of higher energy, where there is more plasticity, this energy is transmitted quickly as longitudinal waves (in the core up to 8 km per second), but as the waves propagate towards more solid matter in the mantle (they will reach speeds of 3 km per second) being less energetic, producing waves of reflection, refraction and diffraction taking curved and unpredictable paths due to the different composition and density of the Earth's lithosphere.



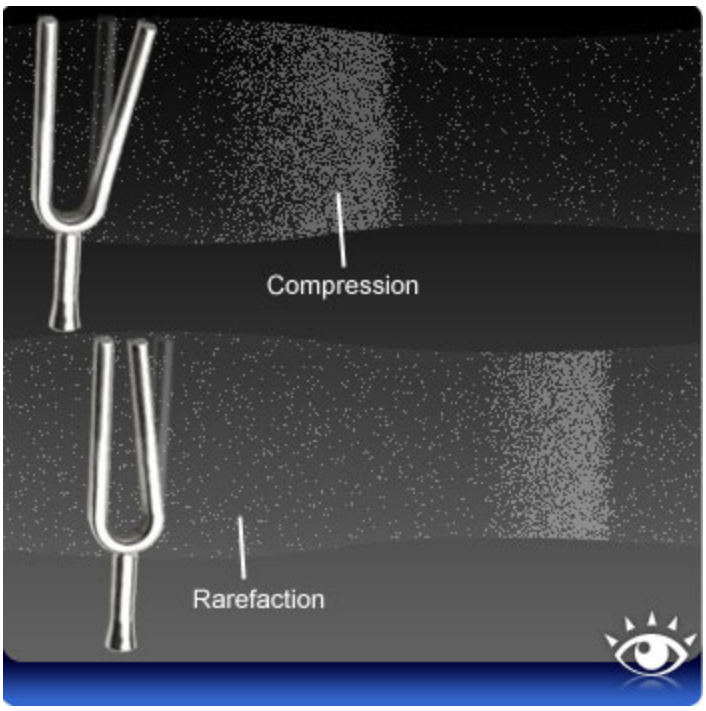
Compositional differences in the lithosphere help inhibit the growth of cracks due to the formation of clusters and the presence of loose rock, but at the same time, the existence of cavities or heterogeneity can cause the initiation of cracks because the mechanical energy that is propagated through matter tends to concentrate at these points of higher brittleness.

There are two types of seismic waves: the “internal waves” and “external waves.”

The “internal waves” travel in the interior of the Earth, and are divided into primary waves (“P” waves, which are longitudinal shape and which give birth to trepidatory earthquakes) and secondary (waves “S” which are transverse, producing oscillatory movements) that transmit the preliminar earthquakes.

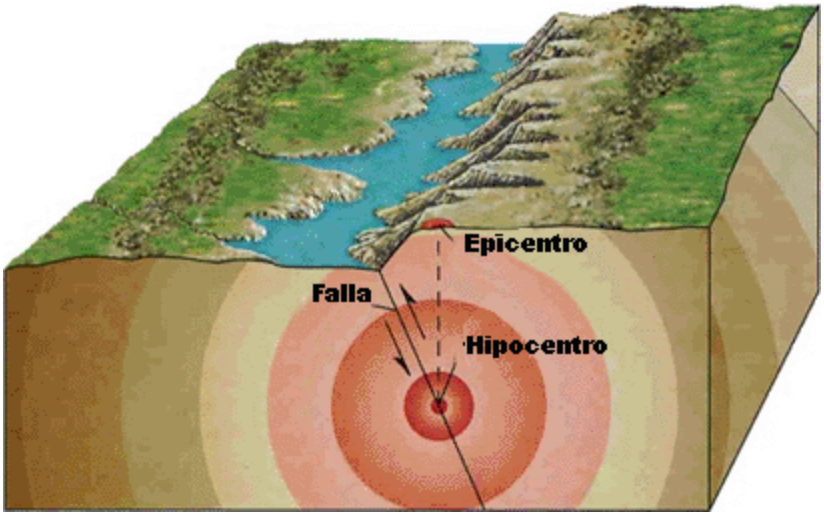


The “surface waves” which are the ones that make contact with the particles of the atmosphere, will rise the pressure in air molecules, creating “compressions” and when the pressure decreases it will create “rarefactions”, carrying energy and transmitting seismic waves which can cause damage to buildings, the generation of faults and sometimes ground displacement and changes in the topography of the lithosphere. This behavior is very similar to sound.



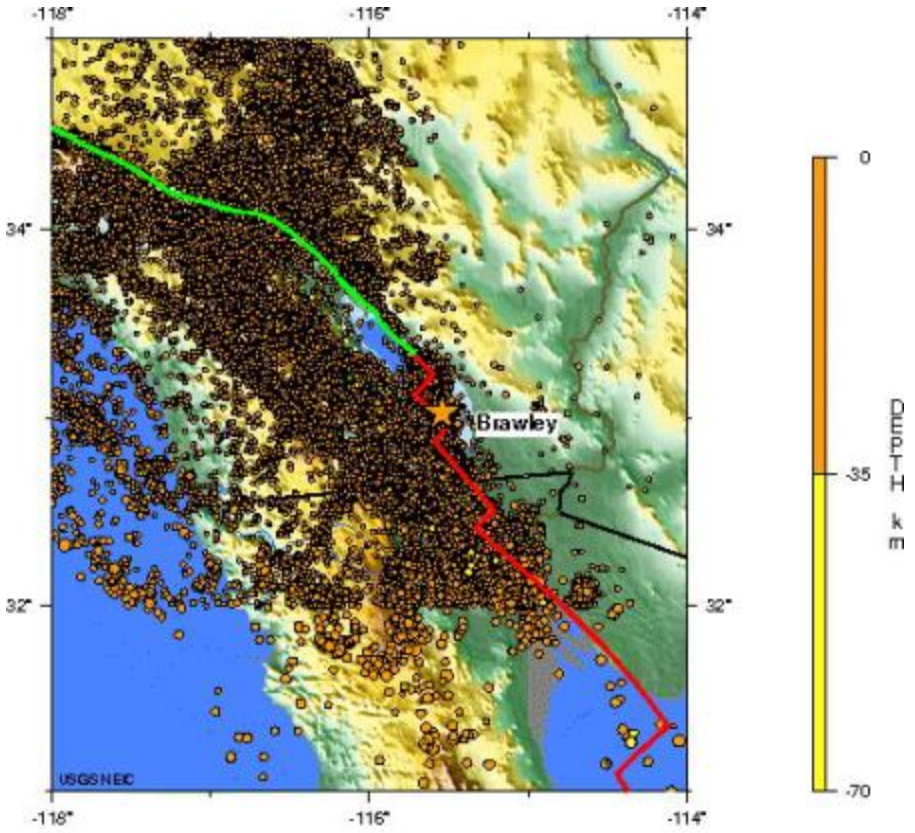
When a large earthquake epicenter is located in the ocean crust, it may displace enough mass to cause a tsunami. Often in the ocean occur small earthquakes that create small harmless tsunamis.

The epicenter is the point on the Earth's surface vertically perpendicular to the "source of the earthquake", while the "hypocenter" is the point on the ground where it is commonly identified the origin of an earthquake.



Earthquakes are usually detected due to the rupture of geological faults in the Earth's mantle, volcanic activity, meteor impacts, nuclear tests, but also in other events under the crust, where there is a point of reflection, refraction and diffraction a mechanical wave from the solid mantle at depths of up to 700 km.

When there is a considerable magnitude earthquake rocks found near the rupture zone are subject to a rearrangement.



During this process there will be generated a series of earthquakes, which are smaller in size, and can occur minutes, days or even years after the main event. The number of these mirrors may vary from a few to several hundred seismic events.

Source :http://www.artinaid.com/2013/04/earthquakes/