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Perspective

A Study of Seismic Wave Propagation

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DESCRIPTION

Brief introduction of earthquake, seismology, seismic waves and elasticity. Since very antique past, the earthquake has been the main concern of humans and a broad subject of scientific quests. Earthquake is a rapid as well as concise movement of the Earth's surface, causing easily broken fractures of the Earth's surface. According to geologists, Earth has suffered earthquakes since hundreds of millions of years even before humans came into existence. Our ancestors believed earthquakes as a supernatural event in the part of geology, earthquake has been only viewed as a natural incident. The study of earthquakes lies within the scope of a special branch of geophysics called Seismology. The term Seismology is the primary method for study of earthquakes which correlates seismic waves or sound waves with the geophysical activities in solid Earth. These seismic waves are generated at a source, which can be both natural such as earthquake and artificial, such as explosion and propagate through and around the Earth. This discipline is fully spanned by several advanced theoretical seismology texts and involves an extensive body of applied mathematics, physics, inverse theory and empirical knowledge. The main thrust of theoretical seismology is to develop and improve various techniques for modeling regional and global scale geophysical processes.

Seismology occupies a motivating position within the new broad fields of Earth sciences and Geophysics. Seismology provides the scope of investigation for movement patterns of elastic waves in various media. Varied interests and application include ascertaining the location of petroleum deposits. A lot of the underlying physics is no more advanced than Newton's second law, F=ma but the difficulties introduced by practical sources, structures and huge data have motivated sophisticated mathematical treatments and extensive use of powerful computers. Seismology theory and studies of Earth structure have got a shot in the arm with the advancement in instrumentation technology and analytics. Establishing seismology, discovering the main structure of the Earth was a long process and as a part of natural science to which various people from different countries contributed significantly. During this period, scientists contributed notably to the development of this new science and many of their discoveries, findings and thoughts are still importance acknowledging today. Nowadays seismology is widely involved in many applications such as seismic source mechanisms, Earth internal structure modelling, finding minerals, oil and natural gas locations, designing the multi-story buildings, towers, bridges, detection of underground cavities beneath construction sites, earthquake resistant buildings designs and beams etc.

CONCLUSION

Main constituents of Earth are silicates and hematite. It has a broad spectrum of magnitudes of force and heat. The response of constituents is more or less elastic to tiny amount of momentary forces, however, viscously beneath the applications of long-lasting forces. This time dependence of the substance properties means that Earth "rings similar to a bell", even as limited forces, such as sudden slip of rock across a fault surface or detonation of a buried explosion took place; while the fluid-like flow of worldwide convection repeatedly reshapes the surface and inside of the globe over geological time scales. The bundles of energy generated by an earthquake are results of elastic waves (seismic waves) that are radial in propagation. Physics of elastic solids provides the scope of study of seismic waves which is fully introduced by the theory of elastodynamics. Major scientific discoveries about Earth's interior were made with the reflection/transmission pattern of elastic wave propagation through Earth.

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