

The Effects of Thick Sediments to Long-period Ground Motion in Northern China

*Yiqiong Li¹

1. Institute of Geophysics, China Earthquake Administration, Beijing, China

The study of ground motion is a cross research field between earth science and engineering science. Theoretical seismologists are more concerned about propagation path and the effect of seismic focus, while engineering seismologists are more concerned with the ground effect. Studies have shown that the western Taiwan coastal plain is influenced by long-period ground motion from the 1999 Chi-Chi, Taiwan, earthquake, and engineering structures with natural vibration long-period are damaged by strong surface wave in the western coastal plain. The thick sediments in the western coastal plain are the main cause of the propagation of strong long-period ground motion. The thick sediments similar to in the western coastal plain also exist in northern China.

It is necessary to research the effects of thick sediments to long-period ground motion in northern China. The numerical simulation of ground motion based on theoretical seismology is one of important means to study the ground motion. We will carry out the numerical simulation of long-period ground motion in northern China by using the existing tomographic imaging results of northern China to build underground medium model, and adopting finite fault source model for wave input. In the process of simulation, our previous developed structure-preserving algorithm, symplectic discrete singular convolution differentiator (SDSCD), is used to deal with seismic wave field propagation. Our purpose is to reveal the formation and propagation of long-period surface wave in thick sediments and grasp the amplification effect of long-period ground motion due to the thick sediments. It will lay the foundation on providing the reference for the value of the long-period spectrum during determining the ground motion parameters in seismic design. This work has been supported by the National Natural Science Foundation of China (Grant No.41204046, 42574051).

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