

Scheme for computing seismic wave propagation in a 3D round sub-global earth model

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We propose a "quasi-Cartesian" finite-difference scheme to compute seismic wave propagation for a very large region model of sub-global scale beyond regional and less than global ones, where the effects of roundness of Earth. This new scheme solves the elastodynamic equations for three-dimensionally heterogeneous (3D) spherical earth model in the "quasi-Cartesian" coordinate system similar to a local Cartesian system, instead of the spherical coordinate system, with a staggered finite-difference method (FDM) which is the most popular in seismic motion simulations for local to regional scale models. The developed scheme can be easily implemented in 3D Cartesian FDM codes by changing a very small part of the codes. It may be able to open a window for multi-scale modelling of seismic wave propagation in scales from sub-global to local one.

Keywords: seismic wave, simulation, finite-difference method