



Upscaling small heterogeneities for seismic wave propagation in 3D complex media

P. Cupillard (1) and Y. Capdeville (2)

(1) Institut de Physique du Globe de Paris, France (paulcup@ipgp.fr), (2) CNRS, Laboratoire de Planétologie et Géodynamique de Nantes, France (Yann.Capdeville@univ-nantes.fr)

Seismic waves propagating in the Earth are affected by different sizes of heterogeneities. When modelling these waves (using numerical methods such as the SEM), taking into account heterogeneities that are much smaller than the minimum wavelength is a challenge because meshing small heterogeneities often requires important efforts and leads to high numerical costs.

In this work, we present a technique which allows to upscale the small heterogeneities that can lie in an elastic medium. This technique yields a smooth effective medium and effective equations. We describe its implementation in the 3D case and we show relevant examples.