

The wavenumber dependence of reflection coefficients of a fracture zone modeled as an anisotropic layer (2)

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We compute the synthetic seismograms of multiply scattered SH waves in 2-D elastic media with densely distributed parallel cracks. We assume randomly distributed cracks in a rectangle bounded region. The crack surfaces are assumed to be stress-free. We can clearly observe the reflected waves in the synthetic seismograms. The reflection coefficient shows a periodical behaviour in low wavenumber ranges and its wavenumber dependence is identical to that of an anisotropic layer. The elastic constant and thickness of the cracked zone are estimated by fitting the reflection coefficient to that of a single anisotropic layer. The elastic constant depends on a crack density, so that it is possible to estimate the density of cracks distributed in a fracture zone when the elastic constant is obtained from the frequency dependence of the reflection coefficient. In an example assumed here, the thickness and crack density are shown to be estimated correctly.