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Wave-induced fluid flow in fractal porous media

Tuesday, 31 May 2022 09:20 (1h 10m)

Wave-induced fluid flow (WIFF), as an intrinsic attenuation mechanism, is a significant mechanism in causing seismic attenuation and dispersion in saturated porous media. However, the fact that the WIFF is related to the complex structure of porous media is always ignored. Since the fractal nature of rocks is revealed, make it possible to study the fluid flow in different scales in a flexible way. In this paper, a poroelasticity model considering fractal distribution of the grain radius is developed and the explicit expression of the quality factor is derived to study the attenuation and dispersion in saturated porous media. Further, the analytic properties of attenuation and dispersion are analyzed. It is shown in the case where the structure is a self-similar fractal medium, the quality factor Q is a power law in the wave frequency, while the exponent of this power law is related to the fractal dimension of the grain radius. These results provide theoretical basis to estimate the formation properties with the seismic data in the future.

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Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

Online

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