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## Multiscale seismology

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The success of a seismic investigation is defined by how well the model used fits the data in the study area. At the same time a model of interpretation is dictated by the type of the data. In seismology we have various observations associated with different frequencies. Namely: Rock sample measurements; 500 kHz; sonic logs; 2 kHz-20 kHz; various types of other seismic observations at lower frequencies. Very often the models of interpretation based on various types of the data for the same areas do not coincide. For example, if we consider a velocity model for wave propagation when the wavelength is less than the thickness of individual layer, the model should be a layered model. In the case when the wavelength is comparable with the thickness of the individual layers, we can treat this situation as an inhomogeneous media with scattering effects. Finally, when the wavelength is much greater than the thickness of the layers, we should investigate an effectively homogeneous anisotropic medium. In the presented paper we consider all three cases and use synthetic seismograms that are constructed for all these situations. The way to finding the link between these apparently different structures made at different frequencies is found and presented. The link between sonic data and lower frequency seismic measurements is established.

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