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# Fracture compliance dependent seismic time delays in laboratory rock samples measured with the Coda Wave Interferometry technique

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The Coda Wave Interferometry (CWI) technique is now an established technique in seismology for studying temporal changes of the elastic properties in scattering media. Seismic velocity variations can be quantified with CWI by analyzing multiplet data, ie. repeating earthquakes. Here we are testing the suitability of using the CWI technique to detect apparent velocity changes caused by variations in the compliance of localized perturbations in media. Ultrasonic data collected from fractured rock samples and discrete element numerical model data are used for this. Data for various fracture compliances in these models are analyzed. The apparent velocity changes, as detected with the CWI technique, are compared with the known variation in signal delay time. Changes in fracture compliance are also monitored by analyzing the frequency dependent transmissivity function. We compare the resolution capabilities of these two techniques for sampling fracture compliance with a view to employing them in the field. Finally the suitability of employing such techniques on earthquake data to monitor variations in the strength of individual faults is considered.