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## Noise-Based Monitoring of Spatiotemporal Changes in Crustal Seismic Wavespeed across Southern California

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Monitoring temporal changes in seismic wavespeed can inform our understanding of the evolution of crustal rocks' mechanical state caused by perturbations in stress field, damages, and fluids. Furthermore, imaging these time-lapse changes in space can help unravel the response of rocks with different elastic properties. In this study, we analyze the spatiotemporal variations of seismic wavespeed in Southern California from 2007 to 2017. We compute the Green's functions by daily cross-correlations using ambient noise at over three hundred broadband seismic stations. Instead of calculating simply the linear regressions of travel-time shifts over lag-times, which only resolves homogeneous changes, we scrutinize the variations of travel-time shifts at different lag-times and frequencies using coda-wave sensitivity kernels, in order to probe the spatial distribution of wavespeed changes. The long-term and large-scale analysis allows us to investigate the mechanical response of different crustal materials to various transient processes. As an example we use the 2010 Mw 7.2 El Mayor-Cucapah Earthquake (EMC) and show that large coseismic wavespeed reductions occur in Salton Sea area and the Los Angeles sedimentary basin. In the latter region, the ground motion amplification and high susceptibility of sedimentary materials explain the remote signature of the earthquake. In the Salton Sea region, particularly in the geothermal area with highly pressurized fluids, the non-linear crustal response illustrated by wavespeed changes can be analyzed with regard to the high-level micro-seismicity triggered by EMC.