Title: Ambient Noise Monitoring of the Near-Surface at Scales

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2019 SAGE/GAGE Abstract

In the last decade the change in seismic velocity, dv/v, from the cross-correlation of ambient seismic noise has emerged as a technique to investigate near-surface and surficial processes such as landslides, volcanic eruptions, earthquakes and changes in groundwater levels. dv/v is a natural complementary monitoring technique to established geodetic near-surface monitoring techniques, such as GPS, InSAR, and GRACE, in that it is a continuous, direct measurement of the subsurface with spatial resolution ranging from meters to continental scales and time scales ranging from hours to decades. Here, we present the state of the art in the field of ambient noise imaging of basin hydrology and near-surface response. Viens et al. (2018) showed that dv/v captured the nonlinear response of the Kanto basin to strong ground motion during the Tohoku-Oki earthquake. Clements and Denolle (2018) used to dv/v monitor multiyear depletions and rapid recharges of groundwater in the San Gabriel Valley. Building upon that work, we present preliminary results from ambient noise monitoring of groundwater across Southern Caifornia using the all of the stations in the Southern California Seismic Network for the past twenty years.

Broader Impacts

Our technique provides a new approach to monitoring groundwater. We will highlight opportunities for regional groundwater monitoring authorities to incorporate dv/v into their monitoring networks.

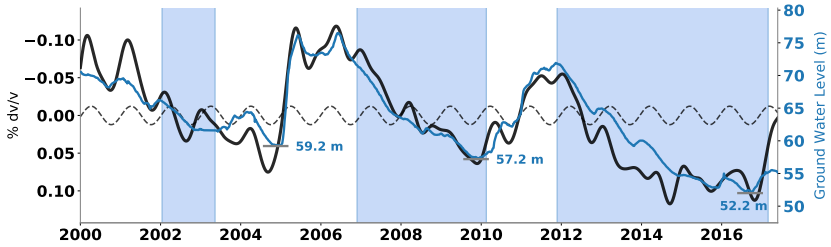

Figure 1: Observed *dv/v* stacked over all station pairs in the San Gabriel Valley (black) with modeled *dv/v* due to thermo-elastic strain (dashed) removed compared with groundwater level change (blue) in the Baldwin Park Key Well from Clements and Denolle (2018). Blue patches indicate times of drought in Southern California.

References

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