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STRONG BASIN-EDGE INDUCED WAVES OBSERVED IN THE COACHELLA VALLEY:AN OPPORTUNITY TO TEST VARIOUS SIMULATION TECHNIQUES?

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ABSTRACT

Following the Landers earthquake, a site-response study was conducted in the Coachella Valley near Palm Springs, California. This site is of particular interest because the largest particle-velocity amplitudes are generated by clear basin-edge induced waves. Eight 3-component sites (5 on the valley sediments and 3 on neighboring bedrock) were occupied during the deployment, and over 200 aftershocks were recorded. These observations provide the opportunity to test and compare the various methods for simulating multidimensional basin response. Furthermore, if satisfactory agreement can be obtained between the Landers aftershock data and predictions, then the important question of how variable the response is with respect to other source locations can be explored. To simulate the response, however, requires a physical model of the sediment-filled valley. The observed time series appear consistent with a 2-dimensional basin structure. By examining gravity data, P- to S-wave conversions, and the fundamental resonant frequency seen in spectral ratios, the relative depth to bedrock across the valley seems well constrained. Unfortunately, the absolute depths remain somewhat ambiguous because the seismic velocities are not well known. Modeling can nevertheless proceed by assuming reasonable values for a first order structure, and then updating the physical model in successive iterations. Furthermore, if there is sufficient interest by others to use this data to test their methodologies, which is encouraged, then further site characterization efforts (borehole and/or seismic surveys) could be initiated. Papers describing the Coachella Valley observations and structural constraints are available upon request.