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*Supplement of*

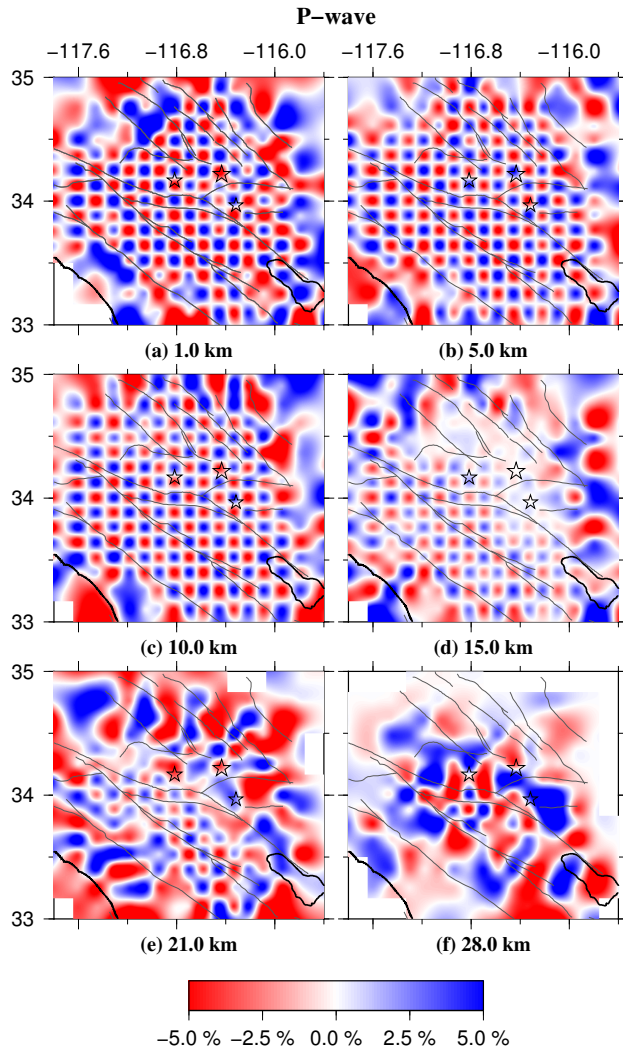
## **Wave-equation based traveltime seismic tomography – Part 2: Application to the 1992 Landers earthquake ( $M_w$ 7.3) area**

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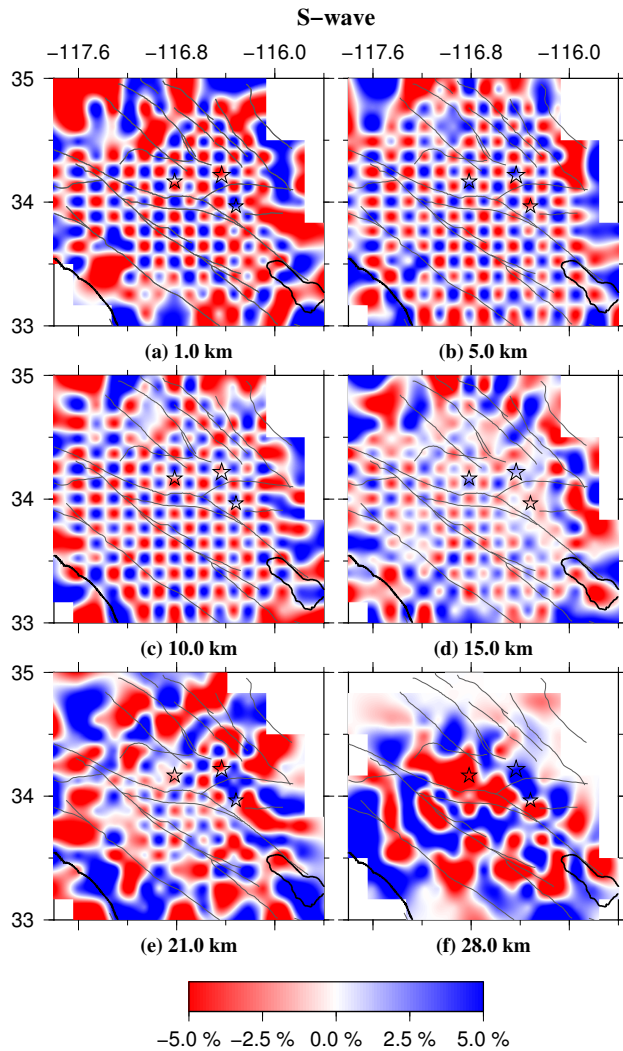
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## 1 Checkerboard resolution tests

To further reveal the ability of WETST in recovering heterogeneous structures, we continue to conduct checkerboard resolution tests by adding noise to the data. To account for the picking errors as existing in the real data, we add random errors with a standard deviation of 0.1 s for  $P$ -wave and a standard deviation of 0.18 s for  $S$ -wave to the synthetic arrival times. Figs. S1-S2 show the results of the checkerboard tests at six layers for the  $V_p$  and  $V_s$  structures, respectively. Comparison between the results shown in Figs. 8a-e and Figs. 9a-e and the inversion results in Figs. S1-S2 generated with random errors shows that the picking errors have very limited influence on the final tomographic results.



**Figure S1.** *P*-wave checkerboard resolution test with the whole chosen data set in this study. Random errors with a standard deviation of 0.1 s were added to the arrival-times.



**Figure S2.** S-wave checkerboard resolution test with the whole chosen data set in this study. Random errors with a standard deviation of 0.18 s were added to the arrival-times.