

# Imaging hidden faults using ambient noise cross-correlations from the Seal Beach dense array

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Mapping preexisting faults is fundamental to properly assess earthquake damage hazards and risk zones. However, in highly developed areas, such as the Los Angeles basin, fault surface expressions are covered by the existing infrastructures or are otherwise hidden from sight; thus, making fault identification and risk analysis difficult. We present a novel imaging methodology based on surface waves derived from ambient noise cross-correlations computed on dense seismic arrays that is able to image faults present in an area. Using this approach, we identify a blind shallow fault with no surface expression fault present in the Seal Beach, CA, area that was previously unknown. We also show a clear correlation between the shallow seismicity observed in this area and the imaged structured from noise cross-correlations. We compare our results to subsurface images obtained from active-survey reflection dataset and observe an excellent agreement between our identified damage zones and faults with the interpreted structures. This methodology would open new opportunities to map and assess earthquake hazard and risk within densely populated areas where fault identification currently remain particularly challenging.

