

## LINKING AMBIENT SEISMIC NOISE HORIZONTAL-TO-VERTICAL SPECTRAL RATIO WITH DAMAGE INDUCED BY SUB-BASIN LOCAL RESONANCES IN STRONG GROUND MOTION

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Ambient seismic noise (ASN) is a widely used source of illumination in both seismological and geophysical studies. Among them, the horizontal-to-vertical spectral ratio (HVSR) is a current measurement aimed to assess the dominant soil frequency and, after inversion, the vertical profile of mechanical properties at a given site. We assume that ASN field and comes from equipartitioned illumination of random sources and the scattering by heterogeneities leads to energies equilibration. This is a diffuse field. This approach is not completely free of uncertainties about the diffuse character of the wave-field and the non-uniqueness of the inversion. Some strategies are being proposed to mitigate these problems. Besides, the lateral inhomogeneity is often ignored. We attempt to introduce it in the cocktail.

Diffuse fields are intrinsically related with the Green's function of a system. Theory asserts that under the diffuse field assumption (DFA) the average directional energy densities (DED) are proportional to the imaginary parts of the Green's function for coincident source and receiver. Therefore, under the DFA the HVSR, or any energy ratio at a point, should be modeled with the imaginary parts of the Green's function.

Clearly, the potential variations of possible substructures greatly exceed any information present in HVSR. As ever, one must supplement with extra information, possibly non-seismic, and learn to live with some uncertainty. We discuss results and examine the implications for seismic hazard assessment.

