

## Normalization during the processing of noise correlations

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Noise correlations are now well known and used in seismology. The main purpose is to retrieve the imaginary part of Green's function and from the identified surface waves, construct tomography maps. The time variations of system properties are considered as well. Several techniques have been proposed for the normalization of noise correlation and a good one should be able to retrieve the exact amplitude of the Green's function. This is generally not the case.

Here we investigate the basis of these normalizations through numerical studies of canonical cases. These examples explore the three points of view that best link the noise correlation with the imaginary part of Green's function: mode equipartition, reciprocity theorem and stationary phase approximation.

The studies consider then the illumination of structures with plane waves, point sources or through a diffusive medium. They are conducted using recent development of the Indirect Boundary Element Method (IBEM), which is well adapted to process diffraction of elastic waves.

Among the various processes, those of windowing, spectral whitening and amplitude normalization are here addressed and others are proposed. Consequences of these normalization methods on the precise assessment of H/V spectral ratio (horizontal component to vertical component of displacement) are also explored.