



## **Enhancing noise cross-correlations to identify higher-mode surface waves**

**A. M. Baig** and M. Campillo (1)

(1) Laboratoire de Géophysique Interne et de Tectonophysique, Université Joseph Fourier, Grenoble, France (Adam.Baig@obs.ujf-grenoble.fr)

Long-distance seismic noise cross-correlations offer a new type of data for geophysical studies. Recognizing that the cross-correlation between stations can be related to the elastic Green's function, we can free ourselves of the resolution problems inherent in illuminating a study area from the uneven distribution of earthquakes: an even distribution of stations over the study area will allow for even resolution. However, because earthquakes occur at various depths, they can excite certain phases much more energetically than those observed in the cross-correlation data, which are dominated by the fundamental-mode surface wave. These higher-mode surface waves and body wave phases are sensitive to deeper structures within the Earth compared to the fundamental mode.

Though these higher-mode surface waves and body waves are subdued, they are present in the noise cross-correlations. We use a time-frequency stacking algorithm, based on the S-transform, to enhance these faster arrivals. The particle motions of these arrivals need to be examined in order to exclude the possibility that these arrivals are due to non-isotropic, fundamental mode energy arriving obliquely on the correlations.