[EJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS10]Seismic wave propagation: Theory and Application

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Seismic wave propagation provides rich information of earth's heterogeneities and the excitation sources. In order to extract the information, integrated studies are needed among mathematical/numerical studies based on the wave theory, miniature physical experiments using rock specimens, and practical data analyses. Furthermore, it is greatly beneficial to conduct comparative studies of various kinds of waves, such as elastic, acoustic, traveling ionospheric disturbances, and oceanic waves. This session widely invites presentations about the theories and applications related to seismic and other geophysical waves.

[SSS10-P02]Estimating the separation between a pair of shallow body-force sources from Rayleigh-wave coda decorrelation

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As an application of coda-wave interferometry, the separation distance between two sources can be estimated from coda-wave decorrelation (e.g. Snieder et al, 2002; Snieder and Vrijlandt, 2005). In these previous studies, body waves in an infinite medium are considered in the theoretical modeling. Therefore, it is difficult to apply this method to shallow sources for which we cannot neglect surface waves. In this study, we incorporate the effect of the free surface in the theoretical modeling by dealing with Rayleigh waves generated by body forces in a homogeneous half space. Referring to the formulation by Snieder and Vrijlandt (2005), we succeed in deriving analytical expressions to relate the decorrelation of Rayleigh wave coda to the separation distance between two sources. According to the results, we are able to estimate the source separation distance in the horizontal direction as far as Rayleigh waves are used. Analytical expressions are simpler for the vertical body force than those for the horizontal body forces. Analytical expressions are different slightly between the two orthogonal horizontal body forces. When body forces are operated independently in two orthogonal horizontal directions, we are able to estimate the separation distance in the two directions separately. Our formulation enables us to estimate the separation distance of a pair of shallow body-force sources from Rayleigh-wave coda decorrelation. We are trying to validate our formulation by using real data. And we are also extending formulation to moment tensor sources that are reasonable for natural earthquakes.