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

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

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Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

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-P08]Sonification of Seismograms for Exploring Dynamic Triggering Earthquakes

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Keywords:Seismic Sonification, Dynamic Triggering Earthquakes

In general, displaying data is important to understand the implication of the data. In seismology, we usually visualize seismograms by plotting them as a function of time. Sometimes we plot seismograms from multiple stations and filter them in order to emphasize the feature of the data. Another way to display the seismic data is the conversion into the audio. The sonification is the technique to assign sounds according to the character of the input data. We have reported the sonification of the strong-motion records for the 2011 Tohoku-oki earthquake (Uchide et al., JpGU, 2016; Matsubara et al., 2016). The sonified audio conveyed the impression that the seismic wave propagated over Japan Islands. In addition, we could hear that the distinct sound from the dynamic triggering event in the Hida Mountain. This is because that we can distinguish sounds in different frequency content. The seismic waves from the dynamic triggering event are more energy at high frequencies (e.g., 10 Hz and higher), however those from the Tohoku-oki earthquake at such high frequencies are attenuated and scattered during the long travel. In the case of the visualization, it is very difficult to find such high frequency waves, since the low-frequency component has much greater amplitude.

Here we are going to apply the sonification technique to the exploration of the dynamic triggering event without any bandpass or highpass filters. At least, this will be useful for the screening. For that purpose, we are developing the software named as Sonification of Seismograms (SoS) to perform the sonification. The sonification technique assigns sounds according to the dominant frequency and the amplitude of the moving time window (Matsubara et al., 2016). The dominant frequency was defined as the number of zero-crossing divided by the length of the time window. The program operates on SuperCollider. By a GUI, we can choose the area where the stations are used for the sonification.

We sonified seismograms for earthquakes greater than M 7 in the world. In front of our poster, we will provide the opportunity to listen the sonified sounds for the seismograms with and without dynamic triggering events.

Acknowledgement

We used the Global CMT Catalog and seismic data from Hi-net of NIED, seismic data from JMA, Hokkaido University, Hirosaki University, Tohoku University, the University of Tokyo, Nagoya University, Kyoto University, Kochi University, Kyushu University, Kagoshima University, and AIST. This work was supported by JSPS KAKENHI 17K14386.

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