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

[S-SS11]Crustal Structure

convener:Yasuhira Aoyagi(Central Research Institute of Electric Power Industry)
Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The aim of this session is to cover seismological and geophysical studies on the Earth's crust. Contribution on seismological and geophysical structure of the crust, processes that develop in the crust which include earthquakes, volcanoes and geological descriptions of the crust are welcomed. We also welcome theoretical and methodological studies that will serve as basics in such explorations.

[SSS11-P15]Towards more appropriate mapping of scattering and intrinsic attenuation in Kyushu

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Keywords:scattering attenuation, intrinsic attenuation

Attenuation of seismic wave energy is caused by two factors: scattering and intrinsic absorption. The former is the scattering of seismic wave energy due to random heterogeneities in seismic wave velocity and the density of the medium, while the latter is the conversion from seismic wave energy to heat energy by internal friction due to anelasticity of the medium. Quantifying scattering and intrinsic attenuation is important to understanding the structure of the lithosphere in terms of seismotectonic features.

In our previous study [Shito at al., 2016, JpGU], we separately estimate scattering and intrinsic attenuation by applying the multiple lapse time window analysis (MLTWA) technique [Hoshiba et al., 1991; Carcole &Sato, 2010]. The results show strong spatial variations in scattering and intrinsic attenuation that depend mainly on the tectonic setting. For frequencies of 1–2 Hz, areas with strong scattering loss correspond mainly to the locations of the volcanoes, while areas with strong intrinsic absorption correspond to the locations of volcanoes and active faults, which are marked by low-velocity anomalies. In the previous study, the values of scattering and intrinsic attenuation were assigned to the position of the seismic station, and then the values are homogenized by using space averaging procedures. There is still room for improvement in the mapping procedure.

The purpose of this study is to explore more appropriate mapping procedure of the scattering and intrinsic attenuation to study the spatial distribution. The essential problem for a correct mapping is to determine the weighting function describing the spatial sensitivity of data to scattering and intrinsic attenuation. In this study, we try to find more appropriate (2-D) space-weighting functions [Del Pezzo et al., 2016] for coda waves by using the Monte Carlo numerical simulation [Hoshiba, personal communication] of the Energy Transport Equation. The resultant images for scattering and intrinsic attenuation obtained by newly developed space-weighting functions will be compared and discussed with those obtained by our previous study with MLTWA.