Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

HDS028-P04 Room:Convention Hall Time:May 24 16:15-18:45

Estimation of Q in a deep subsurface structure modeling for broadband ground motion prediction

Hiroaki Sato[1*], Hiroaki Yamanaka[2]

[1]CRIEPI, [2]TITECH

It is important for broadband earthquake simulation to estimate Q of a deep subsurface structure model considering a different characteristic between long (surface wave) and short period (body wave) motion. In a deep subsurface structure modeling for long period ground motion simulation, Q is mainly determined from numerical modeling by 3D simulation of long period ground motion. For short period ground motion simulation, Q is determined from inversion by assuming 1D wave propagation theory fitting to a transfer function from vertical array data or a site amplification factor from the spectral inversion technique.

Recently we showed that the effect of introducing random fluctuation of S-wave velocity to a deep subsurface structure model on short period site amplification is similar to the effect of adjusting Q (adding damping factor) in the Niigata plain, Japan.

In this study, we estimate the statistical property of random fluctuation by fitting to von Karman type autocorrelation function using digitized log data of sedimentary layer in the Kanto plain. In the logging station, Q of sedimentary layer is also estimated from the inversion of transfer function using the borehole data by KiK-net (NIED). We, therefore, demonstrate the relationship between the Q of deep sedimentary layer and the strength of random fluctuation from log data.

Keywords: attenuation, deep subsurface structural model, random fluctuation of velocity, log data, borehole array observation