# Attenuation and Amplification of Long-Period Component of Ground motion

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**ABSTRACT**: The Central Disaster Management Council constructed 3D subsurface velocity structure models to conduct the strong motion simulations and described the map of natural periods which calculated using the subsurface velocity structures. We evaluated the amplification of long-period component of seismic records, and confirmed that the natural period which calculated from velocity structures related to the amplitude of long-period component of ground motion. The relation was that the longer the natural period at the observation station was, the larger the amplification of long-period component of observed record was. We proposed new attenuation relationship using the relation of natural period and amplification of long-period component of ground motion. The regression formula is

$$\log(Sv) = a(T) \cdot M - b(T) \cdot X - c(T) \cdot \log(X) + d(T_{dg}, T) + e(T)$$

where $Sv$ is the velocity response spectra (cm/s), $X$ the Hypocenter(km), $M$ is the Moment Magnitude, $Tdg$ is the natural period which calculated from subsurface velocity structure. The terms $a$, $b$, $c$, $d$ and $e$ are the regression coefficients.

**Key Words**: Long-period ground motion, Strong Motion, Natural Period of Subsurface Structure