

Regional attenuation curves and amplification rates of station sites calculated by the strong motion DB of JMA

Akimichi Takagi[1]

[1] MRI

Experimental attenuation curve has studied by acceleration amplitude of S wave until now. We attempt to reveal the regional attenuation curves by the strong motion database of JMA, and then made a table of amplification rate of station site.

In this study, assuming that acceleration amplitude of S wave is inversely proportional to the travel distance by geometrical attenuation and that one is directly proportional to the exponential of travel distance by residual attenuation except geometrical one, the relation of attenuation curve is expressed by the following equation:

$$\log(\text{Amp}) = a - \log(D) - b * D$$

where Amp is the acceleration amplitude of S wave; D is travel distance; a and b are constant numbers. The value of b means the degree of attenuation.

We calculated b of 125 earthquakes which earthquake magnitude is over 5.0 and occurred from Jan.1997 to Jan.2003. The value of b is the range of 0.0 - 0.004, and median number is 0.002.

The following is the regional variation of b.

In eastern Hokkaido and east off Hokkaido the b value is small. And the b value of Deep earthquake Near Torishima island is remarkably small. The b value of continental intraplate is intermediately small.

In contrast, the b value is large east off Tohoku, in Hyuganada, in Akinada, in western Kagoshima prefecture, in eastern Aichi prefecture and in central Niigata prefecture.

Amplification rates of station sites are calculated as the average rate of the difference from the attenuation curves relatively. This rate is in the range of 0.25 - 4.0. This table will be available for the earthquake information, and will be basic data for detailed attenuation structure.