

Empirical ground motion model for long period motions and for long distance -Distance dependent geometrical spreading term

MOTOKI, Kentaro^{1*} ; KATO, Kenichi¹

¹Kobori Research Complex Inc.

The GMPEs have been proposed by Sato et al.(2012), Kataoka et al.(2008), and Yuzawa and Kudo(2011). For predictions of long period ground motions on Kanto Plain for the Nankai Trough mega earthquake, the proposed GMPEs cannot be adopted because of the deficiency of applicable distance ranges. In order to establish an adoptable GMPE for long distance, we investigate the distance dependent geometrical spreading term.

We used records for magnitude equal to or greater than 5.0 and distance less than 1000 km. The dataset used in this study is provided by F-net, because of high sensitivity for long period motions and continuous recordings. Since the F-net stations can be regarded as hard rock sites, the site term was not taken into account in the regression.

First, we use a constant geometrical spreading and anelastic attenuation for distance. The regression curve at the 20sec of period decays more slowly than the average of records in the short distance less than 100km, and decays more steeply than records in the longer distance. It implies that the GMPE with a constant geometrical spreading term may underestimate near the source region and in the longer distance.

In the long period range, the dominance of seismic wave changes from the body wave to the surface wave according to the travelling distance, and the slope of the geometrical spreading depends on distance. We will evaluate the geometrical spreading term in the separated distance range to reveal how the geometrical spreading changes.

Keywords: long period motions, long distance, geometrical spreading