

Seismic Hazard Maps for Rather-Long Period Ground Motion

#Shojiro Kataoka

(National Institute for Land and Infrastructure Management)

Rather-long period ground motion (RGM) with period of 2-20[s] generated by great earthquakes may threaten serviceability and safety of structures with long natural period and small damping even in far field. Seismic hazard maps that point out where and how much the RGM predominant are necessary for investigating its effects on the long-period structures such as high-rise buildings, oil tanks, and long-span bridges.

In this study, deterministic and probabilistic seismic hazard maps for RGM are developed using the attenuation relationships for acceleration response spectrum of RGM and the amplification maps to compensate the attenuation relationships for site amplification characteristics (Kataoka *et al.*, 2008). The amplification maps for RGM ($T=7[s]$) and the predominant period map are shown in Fig. 1 and Fig. 2; large amplification and long predominant period can be seen in the major plains.

Fig. 2 shows the deterministic and probabilistic seismic hazard maps for RGM showing pseudo velocity response spectra ($T=7[s]$, $h=0.05$). Only the subduction-zone earthquakes of which source regions are shown in the figures are taken into account. The RGM due to Tokai, Tonankai, and Nankai earthquakes predominates in the maps. As for the Kanto region, the recurrence of the Kanto earthquake predominates in the deterministic map but is overtopped by the Tokai earthquake in the probabilistic map due to the small probability (<5%) of recurrence of the Kanto earthquake in the next 50 years.

These maps can be used for formulation of design ground motion for the long-period structures.

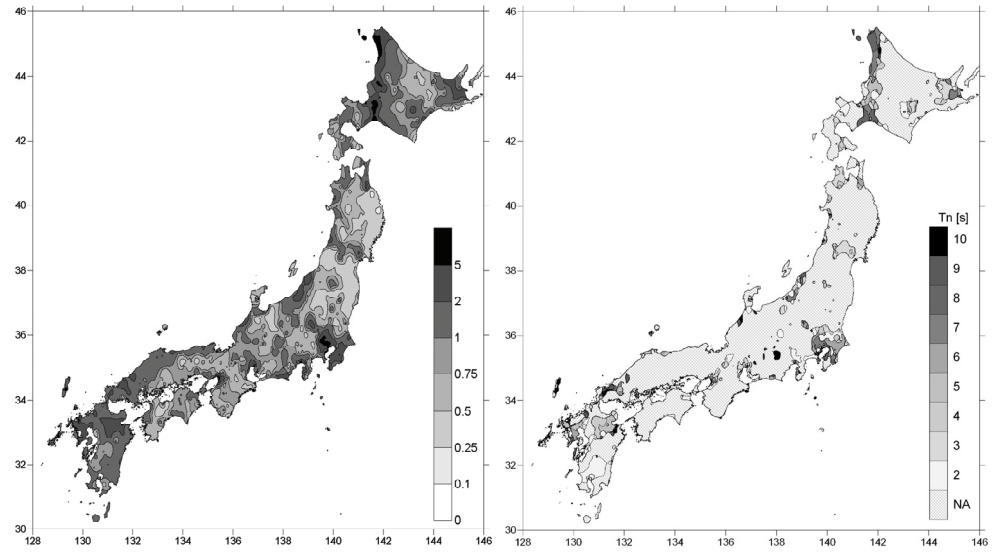


Fig. 1. Amplification map for RGM ($T=7[s]$). Fig. 2. Predominant period map.

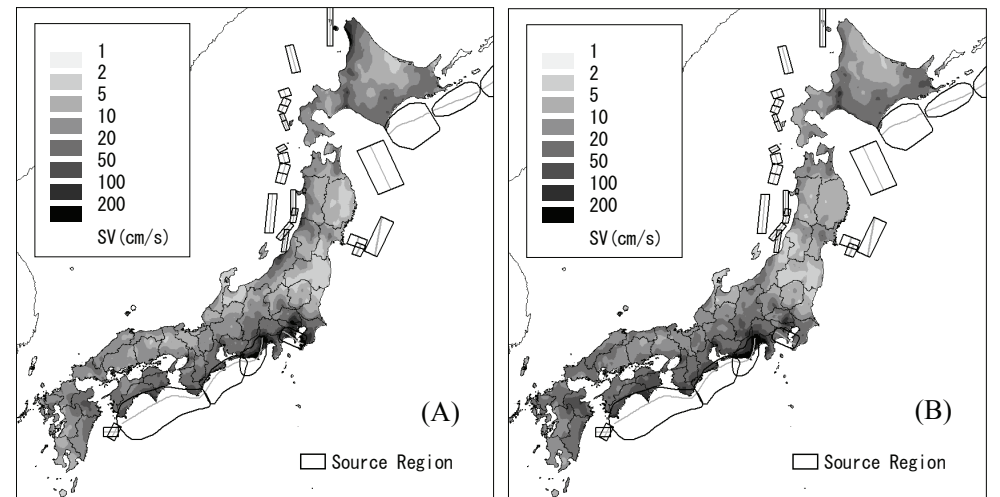


Fig. 2. Seismic hazard maps showing pseudo velocity response spectra ($T=7[s]$, $h=0.05$). (A): deterministic map; (B): probabilistic map (10 % probability of exceedance in 50 years).