

## On the relationship between peak ground velocity and seismic intensity

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The empirical relationship between peak ground velocity (PGV) and seismic intensity is used to predict distribution of seismic intensity in Japan. For example, the relationship by Midorikawa et al. (1999; hereafter M-eq) is applied to the national seismic hazard maps and earthquake early warnings. Although to predict seismic intensity directly is much better, the method through PGV has a great advantage that estimate of site amplification is developed. Fujimoto and Midorikawa (2005) proposed a new relationship (hereafter F-eq) based on recent strong-motion records. We investigate the applicability of these relationships from up-to-dated strong-motion records.

We used strong-motion records of K-NET and KiK-net operating by NIED. We select 33 earthquakes which occurred up to end of June 2008 and observed seismic intensity 6-lower or more at K-NET, KiK-net or seismic intensity station. The F-eq matches better than M-eq especially for records during in-land earthquakes. However, the records during plate-boundary and intra-slab earthquakes deviated to the both relationships. In the case of the 2003 Tokachi-oki earthquake ( $M=8.0$ ), the records match M-eq better than F-eq.

As pointed out by Fujimoto and Midorikawa (2005), ground motions that long-period component are dominant have large PGV comparing with seismic intensity. Disastrous plate-boundary or intra-slab earthquakes are M8-class events while such in-land earthquakes are M7-class events in Japan. In addition, most of plate-boundary or intra-slab events occur at offshore region far from the land. Therefore long-period components often dominate in strong-motions during plate-boundary or intra-slab events. The records in F-eq are mainly composed those of in-land earthquakes such as the 2004 Chuetsu earthquake ( $M=6.9$ ). On the other hand, the records in M-eq include not a small number of plate-boundary earthquakes. We conclude that we should apply F-eq to in-land earthquakes while should apply M-eq to plate-boundary and intra-slab earthquakes at the present situation.

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