Reproduction of "intermediate period" motion in the 1995 Hyogo-ken Nanbu earthquake by simulation for strong motion prediction

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It is very important for earthquake disaster mitigation to accurately predict peak ground velocity at "intermediate period" (period around 1 second) occurring during earthquake strong motion. To reproduce the "intermediate period" of the 1995 Hyogo-ken Nanbu earthquake, we simulated strong motion in Kobe during the earthquake using a staggered grid finite-difference method with nonuniform spacing developed for a parallel computation by Hayashida et al. (2001).

We then successfully reproduced the peak velocity amplitudes at "intermediate period". Our simulation also reproduced "damage belt" very well. From the results we conclude that a detailed 3D basin structure model if possible and a suitable source model are necessary to predict peak ground velociy at "intermediate period".

It is very important for earthquake disaster mitigation to accurately predict peak ground velocity at "intermediate period" (period around 1 second) occurring during earthquake strong motion. In the 1995 Hyogo-ken Nanbu, Japan, pulses of period around 1 second, or "Killer pulse", increased damage heavily. To reproduce the "intermediate period" of this earthquake, we simulated strong motion in Kobe during the earthquake using a staggered grid finite-difference method with nonuniform spacing developed for a parallel computation by Hayashida et al. (2001). We adopted 0.35 km/s for S-wave velocity in the upper layer of the basin.

We then successfully reproduced the peak velocity amplitudes at "intermediate period". Our simulation also reproduced "damage belt" very well. From the results we conclude that a detailed 3D basin structure model if possible and a suitable source model are necessary to predict peak ground velociy at "intermediate period".

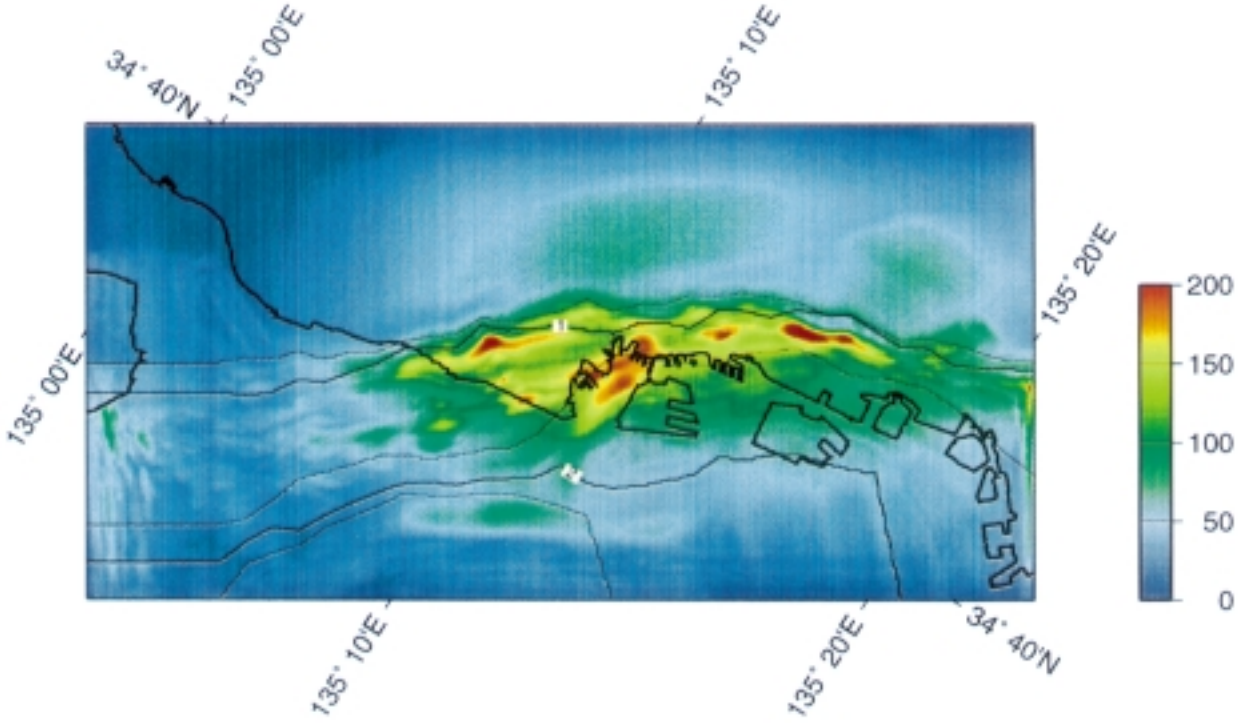

Fig: Computed peak ground velocity of the fault-normal component at the surface which have been bandpass filtered from 0.333 to 2.5Hz.