Dynamic source parameters in the characterized source model (3)

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Irikura and Miyake (2001) proposed characterized source model based on this scaling relation in a RECIPE for strong motion prediction by crustal earthquakes. The availability of the characterized source models has been proved through the strong motion simulation in near-source area in the broadband frequency band (BB) for the 1995 Kobe (Kamae and Irikura, 1997) and for the 1997 Kagoshima-ken Hokuseibu (Miyake et al., 1999) earthquakes. However, in those simulations, they estimated stress drops only for the asperities by forward simulation of the high frequency contents of the records. When constructing a characterized source model for BB strong motion, we need rules to set stress parameters.

For getting stress parameters setting rules for the characterized source model, we have estimated stress parameters using a mapping method of a spatio-temporal shear-stress distribution on the fault plane from a spatio-temporal slip distribution. We estimated stress drops and effective stress for the 1999 Chichi, and the 2000 Tottori-ken Seibu earthquakes. Dynamic parameters averaged over on the asperity and on the background area are estimated from a viewpoint of characterized source model. For both events, dynamic and static stress drops and effective stress are almost similar value and strength excess value is smaller than the stress drop values. Average effective stress value on the asperity area for the 2000 Tottori earthquake is about 20Mpa, whereas that for the ChiChi earthquake is 10Mpa. Those values coincide with the ones that were used for forward ground motion modeling (e.g. Ikeda et al., 2002, Kamae and Irikura, 2002).

Average effective stress values on the background area were estimated 1-7MPa. Those values both in asperity and background area obtained here can be used for the characterized source model.