# Three-dimensional non-planar dynamic rupture process of the 2007 Mw6.6 Niigata-Ken Chuetsu-Oki, Japan, Earthquake

Hideo Aochi[1]; # Aitaro Kato[2]

[1] BRGM; [2] ERI, Univ. Tokyo

The Mw6.6 Niigata-ken Chuetsu-Oki earthquake of the 16 July 2007 has revealed its complex fault geometry according to the aftershock distribution obtained by the post-seismic dense seismic observation (Kato et al., EPS, 2008) and the coseismic deformation measured from the InSAR image (reference). It is inferred that the rupture began on a south-eastern dipping fault and then propagated southward along a north-western dipping fault. The both segments are conjugate planes, which may be overlapping over a few kilometres long, consisting with the external tectonic stress field of the NW-SE compression. However it is not physically clear yet whether such conjugate planes can be ruptured at the same time during a single earthquake as only a few examples have been reported (ex., 1997 Kagoshima earthquake).

We simulate spontaneous dynamic rupture process on a non-planar fault system using a 3D boundary integral equation method (Aochi et al., PAGEOPH, 2000; JGR, 2003). We construct a three-dimensional fault geometry model principally based on the aftershock distribution and test some variation on frictional parameters as well as the external tectonic stress. The supposed initial stress field on both segments is important. Furthermore, our preliminary simulations show that the rupture process on the first segment sensibly controls whether the rupture stops just on this segment or transfers on the second segment even if we begin the simulations with the same initial stress condition. The detailed analysis on dynamic stress field is required.

Understanding the physics of such complex fault mechanism will give an important insight on the possible rupture scenarios in a complex active fault system.