# A comprehensive model of deformation process in the northern Itoigawa-Shizuoka Tectonic Line Fault Zone

# Takeshi Sagiya[1]; Yoshihisa Iio[2]; Takuya Nishimura[3]; Kunihiko Takahashi[4]; Takahiro Homma[5]

[1] RCSV, Nagoya Univ.; [2] DPRI; [3] GSI; [4] Social Technology,Environmental and Industrial Science Group; [5] F-RIC

As a part of 'the Comprehensive Research on Slip and Flow Processes in and below the Seismogenic Region', various surveys and investigations have been conducted around the northern Itoigawa-Shizuoka Tectonic Line Fault Zone. They are a crustal movement observation with a dense GPS array, resistivity structure surveys with the magnetotelluic method, reflection and refraction seismic surveys, seismic observation, receiver function analyses, and so on. We tried integrated modeling of these results with the finite element method.

A two-dimensional finite element model was constructed to simulate a cross section across Omachi in the WNW-ESE direction. Various surveys have been conducted along this line. We assumed the configuration and physical properties of the medium according to the refraction survey results by Takeda et al. (2003). In addition, the deeper extension of the East Matsumoto Basin Fault is assumed based on the reflection survey results by Sato et al. (2003). We compare model calculations with the deformation profile from GPS observations. In order to simulate E-W shortening, we tested various boundary conditions to find an appropriate one. Effects of plastic deformation in the upper crust were investigated, too.

GPS showed that there was a narrow (about 30km wide) zone of large E-W shortening. However, preliminary modeling results demonstrate that heterogeneity of the upper crust is not enough to cause such a concentrated deformation without slip at the deeper fault extension. Plasticity of the upper crust causes localized deformation due to yielding. We are still trying to reproduce the observed crustal deformation pattern by varying frictional property distribution on the fault surface, which we will report in our presentation.