# Microearthquake Distribution & Crustal Structure using the tomography method, around ISTL, by the 2003 Temporary Array Observation

# yannis panayotopoulos[1]; Naoshi Hirata[1]; Tetsuya Takeda[2]; Aitaro Kato[1]; Eiji Kurashimo[1]; Takaya Iwasaki[3]

[1] ERI, Univ. Tokyo; [2] AIST; [3] ERI, Tokyo Univ.

The Itoigawa-Sizuoka Tectonic Line (ISTL) is a major geological structure that divides Japan into NE and SW parts. The northern part of the ISTL was formed as a normal fault in the early Miocene and represents the southwestern boundary of the northern Fossa Mangna sedimentary basin. During the Pliocene the ISTL has been reactivated as a reverse fault due to tectonic inversion after the collision of the Izu-Bonin arc with the Japanese arc. It comprises an active inland fault system with a high slip rate. The northern and central parts of the ISTL have a slip rate of 4 - 6 mm/yr and 1.3 – 2.5 mm/yr, respectively, while the southern part is considered to have ceased its activity.

To reveal seismic activity, which may be related to the ISTL activities, we deployed seismic arrays in northern and central parts. These arrays consisted of 4 stations in the northern area and 9 in the central. At the central part, we also deployed a linear array across the ISTL which consisted of 49 stations in order to reveal the deeper crustal structure in the area. We used 3-component 1-Hz seismometers and long-term recorders with a sampling rate of 100 or 200 Hz. The observation lasted for 3 months from August 4 to November 21, 2003. We observed more than 300 local earthquakes at the northern part of ISTL, but no prominent activity was recorded at the central part during the present observation period. We analyzed these events to locate and reveal the velocity structure along the ISTL.

In the north part of ISTL, using our temporary network and the permanent network in this area deployed by the Japanese Meteorological Agency (JMA), the National Research Institute for Earth Science and Disaster Prevention (NIED) and the Earthquake Research Institute, the University of Tokyo, we determined 334 events with M -1.0 ~ 2.7. The JMA catalog has located only 103 of these events. Most of this activity is concentrated in a cluster at a depth of about 14 km. In order to locate these events accurately, we have applied the Joint Hypocenter Determination method. We estimated station corrections for our temporary network and the regional permanent network. The main cluster is located inside an area of 1 x 1 x 1.5 km approximately. We can clearly see a migration in the hypocenter distribution from a starting depth of about 15.5 km to a depth of 14 km, which is much deeper than the deeper extension of the ISTL. The metamorphic dehydration can be one of the mechanisms responsible for this kind of activity.

The double-difference tomography method was applied to 52 earthquakes and 2 vibroseis shots in the central part of ISTL. We analyzed these events to locate and reveal the velocity structure across the ISTL. In the Vp cross-section we image 2 areas with low Vp values at the Northeast and Central parts. These low Vp zones can be identified on the Geological map as the Yatsugatake volcano depositions and the Median Tectonic Line MTL respectively.