J245-013 **Room: 302** **Time: May 20 13:45-14:00**

Can a reactivation of ancient rift systems trigger devastating intraplate earthquakes?

Aitaro Kato[1]; Eiji Kurashimo[1]; Toshihiro Igarashi[1]; Shin'ichi Sakai[2]; Takashi Iidaka[3]; Masanao Shinohara[1]; Toshihiko Kanazawa[4]; Tomoaki Yamada[3]; Takaya Iwasaki[3]; Naoshi Hirata[1]; Takashi Iidaka Group for the aftershock observations of the 2007 Niigataken Chuetsu-oki Earthquake[5]; Shigeki Nakagawa[6]

[1] ERI, Univ. Tokyo; [2] E.R.I., Univ. of Tokyo; [3] ERI, Univ. of Tokyo; [4] ERI, Tokyo Univ; [5] -; [6] ERI, the Univ. of Tokyo

Large historical and recent intraplate earthquakes have been concentrated along a contractional zone at the eastern margin of the Japan Sea back-arc basin. Within the contractional zone, two destructive intraplate earthquakes (both events have the same M 6.8) showing reverse faults with a strike of approximately N35E recently occurred in the Niigata region: one on October 23, 2004, and the other only 30 km away on July 16, 2007. We have conducted a series of temporary seismic observations through a dense deployment of 145 portable stations after the 2004 earthquake [Kato et al., 2007] and 68 portable stations including 20 ocean bottom seismometers after the 2007 earthquake [Kato et al., 2008; Shinohara et al., 2008]. To investigate the entire buried rift structure from the surface to the lower crust, we further deployed a very dense linear-seismic array with a length of 40 km after the 2007 earthquake; the array extended from the coastline to east of the SKTL.

Here we present high-resolution three-dimensional tomographic imaging of seismic velocities in this zone using data from the dense seismograph deployment. We discover that stepwise and tilted block structures of the basement, which are geophysical evidence of a Miocene rift system, are widely distributed beneath the thick sedimentary basin. Most aftershocks following recent intraplate earthquakes align roughly along the tilted block boundaries and are controlled by weaknesses associated with buried rift systems. Furthermore, slow anomalies are localized beneath the seismogenic zones, suggesting that fluids may have locally weakened the strength of the lower crust. We propose that stress loading through ductile creeping of the weak lower crust reactivates pre-existing weak faults within ancient rift systems, leading to devastating intraplate earthquakes.