



Investigation of concealed active faults using ground-penetrating radar in Kobe mega-city, Japan

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Kobe mega-city is located between the Rokko Mountains and the Osaka Bay, southwest Japan. Neotectonically active faults are developed in this mountain, north of its urban area, while some concealed active faults were newly found in the northern Osaka Bay, south of its urban area, by using seismic and acoustic reflection surveys after the 1995 Hyogoken-Nanbu (Kobe) Earthquake. However, the linkage of active faults in between the Rokko Mountains and the Osaka Bay is not yet known. Accordingly, we investigated the active faults in this urban area using the ground-penetrating radar (GPR) and boring database (Kobe Jibankun) in order to become clear their linkage. The total length of the GPR survey lines is 6.21 km. We used the 200 MHz, 100 MHz and 35 MHz frequency antennas for GPR measurement. The GPR data were processed to accentuate geologic features by high pass filtering, low pass filtering and migration. We made the following observations based on our GPR imagery and the boring database: (1) We found detection of anomalous reflectors, characterized by deformation of multiple sub-horizontal reflectors with either a reflector-bend-mode or a reflector-break-mode on the GPR imagery; (2) The two modes indicate that the deformation associated with faulting reaches to the subsurface layers; (3) Their deformation appears along the southwestward extension of two active faults (Uzugamori and Yahatadani faults) in the Rokko Mountains. These active faults are thought to extend respectively to the southwest across the urban area of Kobe, and to link up with the concealed active faults (Oji and Wada-misaki faults), branching away from the Osaka-wan fault in the Osaka Bay. Therefore these linked active faults are thought to be very important as scenario faults for mitigation of earthquake disaster in Kobe.