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Tectonic topography and active fault outcrop in the eastern focal area of the 1943 Tottori Earthquake

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The magnitude (Mj) 7.2 Tottori earthquake occurred on 1943 in the Tottori Province of Japan, resulting in great damage throughout Tottori City urban area mainly. In the hill or mountain area west Tottori plane, there were two echelon surface ruptures called Yoshioka fault and Shikano fault associated with this earthquake known by previous studies (Tsuya, 1944). On the other hands, in the hill or mountain area east Tottori plane, surface rupture had not been confirmed.

Recently, the active fault was found by aerial photo investigation in this area (Takada et al., 2003), and there was not surface rupture because of the vertical slip distribution of this area was estimated to be deeper than the west area (Nakata, 2009). We have been studied geomorphological and geological survey for the purpose of seismic hazard assessment. In this presentation, we conclude the results of high resolution topographic investigation and active fault outcrop observation along the tectonic topography in the eastern part of the focal area.

Aerial photographic survey is using 1/20,000 scale (CG-75-2X) and 1/10,000 scale by U.S. military forces. We interpret DEM using shaded relief map and stereoscopic bird's-eye view made from 2m mesh topographic data which is obtained by airborne laser scanner of Kokusai Kogyo Co., Ltd. The outcrop survey and survey of the small trench excavated by man power are conducted by observation and sketch of the wall surface after the wall has been made flat and smooth.

As a result of topographic survey, we found consecutive tectonic topography which is right lateral displacement of several ridge and valley lines along the ENE-WSW lineament in the mountain area from Momodani, Tottori city to Kujira, Fukube town. We interpret four other relatively short lineaments which are parallel in this lineament east of Tottori City urban area. These short lineaments are composed of cols and rectilinear valleys, and we found an active fault outcrop (Takiyama outcrop) along the southernmost part of the short lineament. Takiyama outcrop have the active fault which cut the layer of DKP (Daisen-Kurayoshi tephra: 55ka) which apparent vertical displacement is ca.90cm, and we confirm that the fault has been repeatedly moved during late Quaternary. A small trench is excavated to study the latest event in focus just behind the outcrop in the col topography. As a result of this survey, the age of the latest event is limited between before depositional age of K-Ah (Kikai-Akahoya tephra: 7.3ka) after AT (Aira-Tanzawa tephra: 26-29ka).

Keywords: 1943 Tottori earthquake, tectonic geomorphology, active fault outcrop, DEM investigation, aerial photo investigation