Geomorphological and Geological Factors of Surface Cracks in Aso-caldera in association with the 2016 Kumamoto Earthquake

*Haeng-Yoong Kim[1], Mizuki Nagai[1], Tsuyoshi Haraguchi[1]

1. Osaka City University, Graduate School of Science, Division of Biology &Geosciences

In The Kumamoto earthquakes of April 14, 2016 (Mw 6.5) and 16 (Mw 7.0), the surface was ruptured by the lateral strike faulting with normal faulting on the eastern half of the Futagawa fault zone and on the northern part of the Hinagu fault zone (Kumahara et al, 2016; AIST, 2016). The length of surface rupture is estimated as 27 km. However, factors of the ground destruction that caused the damage have not been sufficiently elucidated. Clear surface cracks appeared in the northeast - south - western direction in the lowland of the Aso caldera located on the east side of the Futagawa fault zone. Regarding the cause of this crack zone, Lin et al. (2016) and Nakata et al. (2016) assumed an earthquake fault, but Kuroki et al. (2016) said it is due to the lateral movement of the ground. On October 8, 176 days after the main shock, Nakadake wss erupted in Mt. Aso located in the west of the Futagawa fault zone. To clarify the origin of surface cracks in the Aso caldera is extremely significant in understanding the location relationship between active faults and volcanoes. Present study investigated the distribution and displacement pattern of cracks, (2) the geomorphological and geological elements of crack formation fields, and (3) the existence of active fault topography in the Otohime district located in the central part of the crack zone in the caludera. We, then, propose that the cause of the crack is not fault rupture but is by the gravitational mass-movement.

Keywords: Kumamoto Earthquake, Aso-caldera, Cracks, Lateral Mass Movement

