

Past activity of 'triggered fault' in the northwest of outer rim of Aso caldera estimated from the results of excurvation survey and displacement topography

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Matoishi Bokujo 1 Fault is one of the "triggered faults" in the northwest of outer rim of Aso caldera associated with the Kumamoto Earthquake in 2016 with clear tectonic geomorphology, significant phase discontinuity appeared in SAR interferometry and surface displacement in the field. We carried out a geomorphological and geological survey including a pit excavation, ground penetrating radar (GPR) survey and simple core samplings in a site on the fault, and discussed the history of past activities. We excavated a pit with 10 m long and 4 m deep at maximum at the bottom of the fault scarp and observed the both walls. A white Aso-4 pyroclastic flow deposit appeared at the bottom of the walls, directly covered by a river bed deposit composed of medium sand and granule and a debris flow deposit composed of rubble on the pit valley side, and the slope sediments of brown sand and mud with rubble on the pit mountain side. They are covered with slope sediments of black sand and mud that accompanies with rubble or that are scarce in rubble. At least two fault ruptures appeared with displacements of these strata and disorientation of gravel. We assume that the upper surface of Aso-4 at the bottom of the walls shows the unconformity of the deposition surface when the pyroclastic flow arrived in 90,000 year BP, for the low relief surface surrounds this area which is the deposition surface of Aso-4 pyroclastic flow, and outcrops of Aso-4 pyroclastic flow deposit are widely observed at a comparatively shallow position, i.e. several meters below the surface of the earth. From the pit survey and the simple core samplings, it is estimated that the upper layer of the white layer gradually lowers its altitude from the south to the north toward the fault scarp, and is raised about 10 m above the fault scarp, consistent with the topography and displacement pattern by SAR interferometry. Considering the results of the ¹⁴C dating of the black soil of the slope sediments collected from the wall, a faulting event which brought the movement of slope deposits from the mountain side resulting the coverage of river deposit at the valley side occurred in between about 3,500 and about 3,400 years ago, followed by another faulting event that caused two fault ruptures in between about 3,500 and about 2,000 years ago or younger. It is suggested that the number of events experienced by lower slope sediments is larger than that of upper one (the amount of displacement of upper one is about 2 times). This suggests that the accumulation of displacements like this time formed fault scarp of Matoishi Bokujo I Fault.

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