

Near-surface geophysical survey and hearing survey of housing damages at Yasunaga district, Mashiki Town stricken by the 2016 Kumamoto Earthquakes

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We conducted a detailed geophysical survey to the near surfaces and hearing survey of housing damages at Yasunaga District, Mashiki Town stricken by the 2016 Kumamoto Earthquakes. The geophysical survey was carried out in March 2017 along a 350 m long short survey line set on a road between Route 28 and Akitsu River. Hearing survey was also conducted along the survey line. We directly interviewed with residents in May 2018, or indirectly inspected housing sites. A total of 31 dwellings were surveyed supported by board members of the Yasunaga District community association. We could have quite valuable information on the earthquake related evidences as exemplified as follows; 1) ground water sprang out from an open crack under the floor and the housing was divided into two segments. 2) Dry wells revived just after the earthquake and were still pouring ground water. 3) Bulges were generated along a street or the boundaries between roads and dwellings. Different types were reported on the mode of occurrence of ground deformation between the northern and the southern part of the surveyed district. No specific deformed structure or faulting structure was identified in the near surfaces along the survey line set in the Yasunaga District. In contrast, a thick soft layer characterized as low resistivity and low Vs occupied the surfaces up to 20 m deep at the southern half of the line, or Akitsu lowland area. The above evidences strongly suggest that surface deformed structure observed in the Yasunaga District was originated by non-tectonic forces influenced by local artificial topography and the existence of the soft layer instead of active faulting. Our survey results also demonstrate the importance of high-resolution near-surface geophysical surveying and direct interviewing to the residents for the detailed understanding of local earthquake disasters.

Keywords: 2016 Kumamoto Earthquakes, Mashiki Town, Yasunaga District, near surface geophysics, housing damage survey