## Near-source fault strong ground motion characteristics of the 2016 Kumamoto earthquake

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The 2016 Kumamoto mainshock (Mw7.0) produced a surface ruptured fault of about 30km long with maximum 2m offset, and identified as a surface ruptured event. We have collected near the surface ruptured fault and investigated characteristics of those strong ground motions. As the acceleration records consist of the baseline errors caused by nonzero initial acceleration and tilting of the accelerograph, we carefully remove the baseline errors so as to obtain reasonable velocity and displacements. The observed permanent displacements are about 1.2m in horizontal direction and about 0.7m sinking in vertical direction at Mashiki town hall, and about 1.7m and 1.8m, respectively, at Nishihara village hall. Those permanent displacements coincide to the results by GNSS and InSAR analysis (e.g., GSI, 2016). It takes only about 3s to reach the permanent displacements at both stations. Direct observation for the rupture timings estimated from fault normal displacements (e.g., Aki, 1968) indicates the apparent rupture velocity is about 4-5km/s along the Futagawa fault, showing upgoing rupturing in this source region.

Those observed velocity ground motions show a long-period of about 3s, pulse-like shapes, those are showing large seismic response in that period range. Such long-period ground velocities are generated by the rupture characteristics of the source fault in the shallower part from the kinematic source inversion analysis (Asano and Iwata, 2016). The long-period ground motions generated by the surface ruptured fault will be an important topic of the seismic hazard although there are few observations.