

Geometry and kinematics of surface fault ruptures produced by the 2016 Mw 7.0 Kumamoto earthquake: Computerized X-ray tomography analysis of three dimensional fault geometries in basement-induced oblique-slip faulting

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The 2016 Mw 7.0 Kumamoto earthquake produced surface ruptures along the Futagawa and Hinagu fault zones. The surface ruptures consist of ENE-WSW trending right-lateral faults, WNW-ESE trending left-lateral faults and ENE-WSW trending normal faults. We perform sandbox experiments by using X ray CT scanner to analyze the kinematic evolution, as well as the three -dimensional geometry, of faults in basement-controlled oblique-slip faulting. The geometry of the shear bands (Riedel shear and antithetic Riedel shear) in the experimental model shows a strong resemblance to the surface ruptures along the Futagawa fault zone. These complex surface ruptures may result from the effect of thick overburden consisting of Quaternary sediments and pyroclastic- flows.