

Clues to evaluate short active fault learnt from the 2016 Kumamoto and Ibarakiken-hokubu, Japan, earthquakes

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Inland large earthquakes occur not only on major active faults but also in areas no active fault and/or minor short fault mapped. The number of potential destructive earthquakes of $M \sim 7$ estimated from the major active faults would be significantly underestimated. It leads a conservative evaluation that seismogenic fault as long as ~ 20 km is hidden or slightly truncated by the surface, and an $M \sim 7$ earthquake is assigned on each short fault. Based on field investigation and InSAR analysis at the 2016 Kumamoto earthquake, we here counter-argue that some of such minor and low-slip-rate faults might have been developed by insignificant but frequent slips triggered by nearby large earthquakes. Another implication is provided by recent $M \sim 6$ class earthquakes at Ibaraki-ken-hokubu, northern Kanto region. March 19, 2011 ($M_j=6.1$) and November 22, 2016 ($M_j=6.3$) Ibaraki-ken-hokubu earthquakes that might have shared a same short fault based on InSAR images and field survey. It enables us to interpret many short active faults might have been also developed by more frequent slip at only upper seismogenic layer due to $M \sim 6$ earthquakes.

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