

Defining subsegment boundaries : An example from the Kamishiro fault of the Itoigawa-Shizuoka Tectonic Line active fault system

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Due to a direct relationship between rupture length and magnitude of an earthquake, fault segmentation is crucial in assessing future seismic hazard. Paleoseismological studies have shown that active faults tend to behave non-characteristically, thus rupture partially or with adjacent faults. To fully reconstruct such variable paleo-earthquake records, it is necessary to understand origins and roles of a sub-segment (referred to as a section in this study). I defined three section boundaries of the Kamishiro fault, which is a northernmost segment of the Itoigawa-Shizuoka Tectonic Line active fault system and has caused the Mw 6.2 earthquake on 22 November 2014, based on topography, vertical slip rate, and surface fault geometry. These section boundaries are inferred to result from a change in shallow stress field related to surface processes, such as river incision and burial of a fault tip. In addition, by comparing these section boundaries with those deduced from co-seismic slip and aftershock distributions accompanied by the 2014 event, it is concluded that some section boundaries behave persistently and one of the key factors controlling the roles of section boundaries is the difference in sub-surface structure between adjacent sections.

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