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EC, initial magnetic susceptibility and grain size as a proxy for vertical slip event by submarine reverse fault

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Reconstructing paleoseismisity for a long period is very important for the progress of a repetition model of large earthquakes. The Kuwana fault is the reverse fault that locates on the west edge of the Nobi plain, and is covered with thick shallow marine and beach deposits in Holocene.
In Naruhashi et al. (2004) and Naruhashi et al. (2008), high accuracy depositional curves of No.200, No.275 core (downthrown side), and No.350 core (upthrown side) that had been drilled in the direction crossed the fault, are constructed using 52 ^{14}C ages of shallow marine sediments. Next, a model called "altitudinal difference curve" (ADC) was constructed for detecting the faulting event horizons based on changes in the depositional rates on both the hanging wall and footwall. In this method, it turned out that there were seven faulting events during the last 7,000 years in the Kuwana fault including two historical earthquakes. Those ages of seismic events were approximately 6600 cal yBP, 5700 cal yBP, 4000 cal yBP, 3600 cal yBP, 2100 cal yBP, A.D.745, and A.D.1586.
Based on the above-mentioned result, we examined whether the change in grain size composition, electric conductivity, and initial magnetic susceptibility could be used as the proxy showing the faulting events produced by the Kuwana fault whose probable event horizons were obtained in Naruhashi et al. (2004) and Naruhashi et al. (2008). For grain size in downthrown side cores of No. 200 and 275, spike-like increase is recognizable on the probable faulting event horizons presumed from the ADC. The grain size once decreases upward at the unit with relatively higher depositional rate, and then it decreases again. Magnetic susceptibility has the tendency to increase sharply at around the probable faulting event horizons. In both No.200 core on the downthrown side and No.350 core on the upthrown side, EC changes corresponding with the faulting events. That is, it increases in the downthrown side after the earthquake event, while it decreases in the upthrown side. Moreover, grain size, EC, and magnetic susceptibility show changes in depth 23-24 m and 28-29m on the downthrown side similar to changes around faulting event horizons on the downthrown side described above. These imply the possibility that the above proxy changes indicate two older faulting event horizons.

Keywords: electric conductivity, initial magnetic susceptibility, grain size composition, Kuwana fault, shallow marine sediments