

Co-seismic crustal movements along reverse faults which subsidence component is larger than uplifting component

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Introduction

Reverse faulting should cause crustal movement which uplifting component is larger than subsidence component. There are many reverse faults which subsidence component is larger than uplifting one in the Niigata-Kobe and eastern margin of Japan Sea tectonic zones during geological era, Presenter gathered examples of historical co-seismic crustal movement along such faults.

Example 1. Kuwana fault and AD 1586 Tensho Earthquake, Mie Pref., central Japan

Height of the MIS5e shoreline in the uplift area of the Kuwana fault is +63m, it of the upper surface of MIS5e marine deposits in the subsidence area is -92 to -72m.

This fault is one of the source of the 1586 Tensho Earthquake, however a house built on AD 1576 is existing in the subsidence area near the coast at that time. Almost all medieval structural remain surfaces in the subsidence area are less than 1m beneath ground in depth.

Example 2. Hyuuga fault and AD 1662 Kambun Ohmi-Wakasa Earthquake, Fukui Pref., central Japan

Height of the MIS5e shoreline in the uplift area of the Hyuuga fault is +15 to +16m, and it of the upper surface of the MIS5 lacustrine sediments in the subsidence area is -90 to -80 m.

Ahistorical document reported 2.4 m uplift on the north eastern side of Lake Mikata (Suga) and 1.5 m subsidence on the south western side of it occurred during the 1662 Kambun Ohmi-Wakasa Earthquake.

Example 3. Noshiro fault zone and AD1694 Genroku Noshiro Earthquake, Akita Pref., north eastern Japan

Height of the MIS5e shoreline in the uplift area of the Noshiro fault is +30 to 60m, it of the upper surface of the MIS5e marine deposits in the subsidence area is -85m. The 1694 Genroku Noshiro Earthquake induced uplifting of northern bank of the Hachiro-gata lagoon, but no reports describes subsidence in the footwall side of it.

Conclusion

These three historical co-seismic crustal movement along the subsidence prevailing reverse fault did not go with distinct subsidence. This suggests aseismic subsidence in the footwall side of these faults have occurred in the geological era.

Keywords: historical earthquake, co-seismic crustal movement, reverse fault, Niigata-Kobe tectonic zone, eastern margin of Japan Sea tectonic zone