

Active tectonics of the western flank of the Mahiru Mountains, northeast Japan.

Kyoko Kagohara[1]; Toshifumi Imaizumi[2]; Tatsuya Ishiyama[3]; Kenshiro Otsuki[4]

[1] Graduate School of Sci, Tohoku Univ.; [2] Geography Sci., Tohoku Univ.; [3] Tohoku University; [4] Earth Sci., Tohoku Univ.

The eastern margin of the Yokote basin fault zone (EYBFZ) is one of the largest active thrust fault systems in northeast Japan. It is located along the western flank of the Mahiru Mountains. The EYBFZ generated the Rikuu earthquake in A.D. 1896. The northern portion of the EYBFZ is comprised by a pair of an east-dipping thrust fault that lies at the base of the western flank of the Ou backbone Range and a frontal thrust fault that lies at the base of the foothills west of the mountains. The frontal thrust faults consist of three segments (i.e., Shiraiwa, Ota and Senya fault) located along the western margin of the foothills.

High-resolution seismic reflection profiles across coseismic fault scarps during the A.D. 1896 Rikuu earthquake along the EYBFZ, tied with borehole stratigraphy and geologic mapping provides insights into its detailed kinematic history and structural evolution. Although along-strike variation of thrust geometries both at ground surface and at shallow depth, the EYBFZ has commonly formed as a breaking forward imbricate thrust system. Near surface complexity of thrust geometries appears strongly affected by mechanical decoupling between layers within shallow marine mudstone.

Cross section balancing across the Mahiru Mountains shows strong coupling of mountain topography with long-term (10^6 yrs) uplift, in spite of their weak coupling with amount of short-term (10^4 yrs) uplift rates and coseismic uplift. This suggests that mechanical decoupling of Miocene mudstone that has worked as frontal emergent thrust faults may have enhance slip at coseismic to short timescales.