

Principal Research Results

Increasing Development of Paleoseismic Investigation Method for Seismic Hazard Assessment of Large Active Fault Systems – Evolution of Fault Systems and Associated Geomorphic Structures: Fault Model Test and Field Survey –

Background

Understanding of fault evolution and associated geomorphic structures along large active fault systems is necessary to identify the fault trace corresponding to the latest surface-faulting event within fault zones for seismic hazard assessment. However the three-dimensional kinematic evolution of fault systems and associated geomorphic structures are largely unknown.

Objectives

The purpose of this study is to gain a better understanding of three-dimensional kinematic evolution of fault systems and associated geomorphic structures through fault model test and field survey, and to present criteria for determination of the location for drilling, trenching, and geophysics as paleoseismic investigations.

Principal Results

Sandbox experiments and field surveys were performed to investigate fault system evolution and fault-related deformation of ground surface, the Quaternary deposits and rocks. The summary of the results is shown below.

- 1) In the case of strike-slip faulting, the basic fault sequence runs from early en echelon faults and pressure ridges through grabens and faults offsetting pressure ridges. Hence the best sites for dating the latest surface-faulting event on large active fault systems are grabens and fault scarp offsetting pressure ridges.
- 2) Low-angle and high-angle reverse faults commonly migrate basinward and rangeward with time, respectively. Accordingly, the best sites for dating the latest surface-faulting event on low-angle and high-angle reverse fault systems are the most basinward and rangeward faults, respectively.
- 3) With increasing normal fault displacement in bedrock, normal fault develops within range after reverse fault has formed along range front. It is important to determine the site for paleoseismic investigation according to the developmental stage of the fault system.

Future Developments

The established criteria will be applied to a paleoseismic investigation on large active fault systems.

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Reference

- 1) Ueta, 2003 “Evolution of Strike-slip Fault Systems and Associated Geomorphic Structures: Model Test” CRIEPI Report, No. U03021(in Japanese)
- 2) Ueta at al., 2003 “Study on Seismic Hazard Assessment of Large Active Fault Systems -Evolution of Fault Systems and Associated Geomorphic Structures: Fault Model Test and Field Survey-” CRIEPI Report, No. U03022(in Japanese)

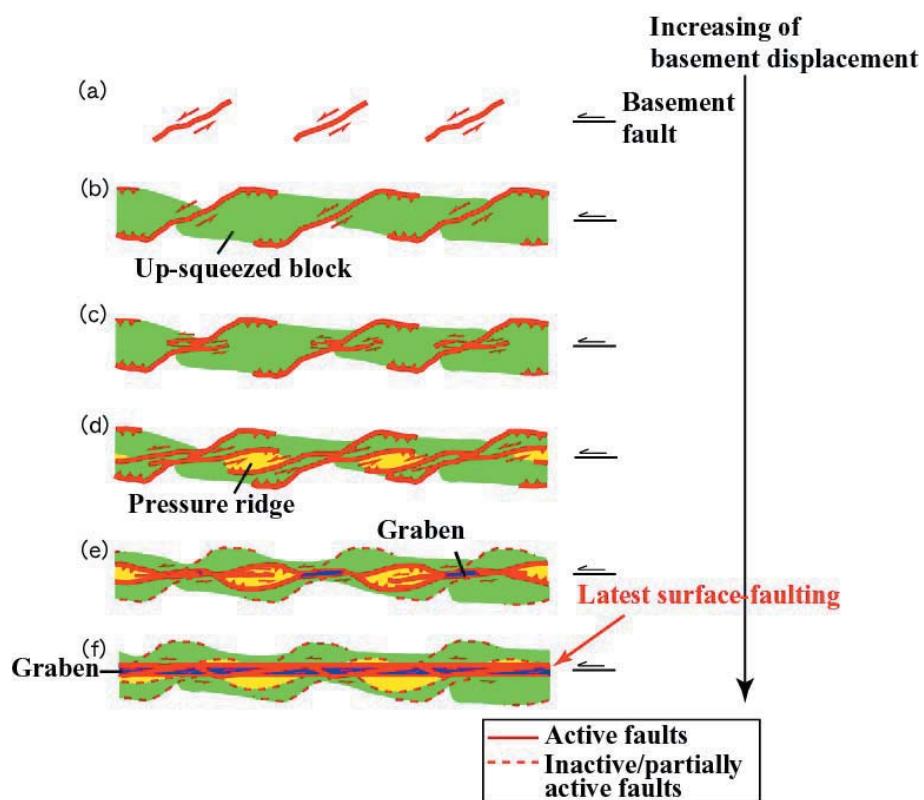


Fig.1 Evolution of strike-slip fault systems and associated geomorphic structures.

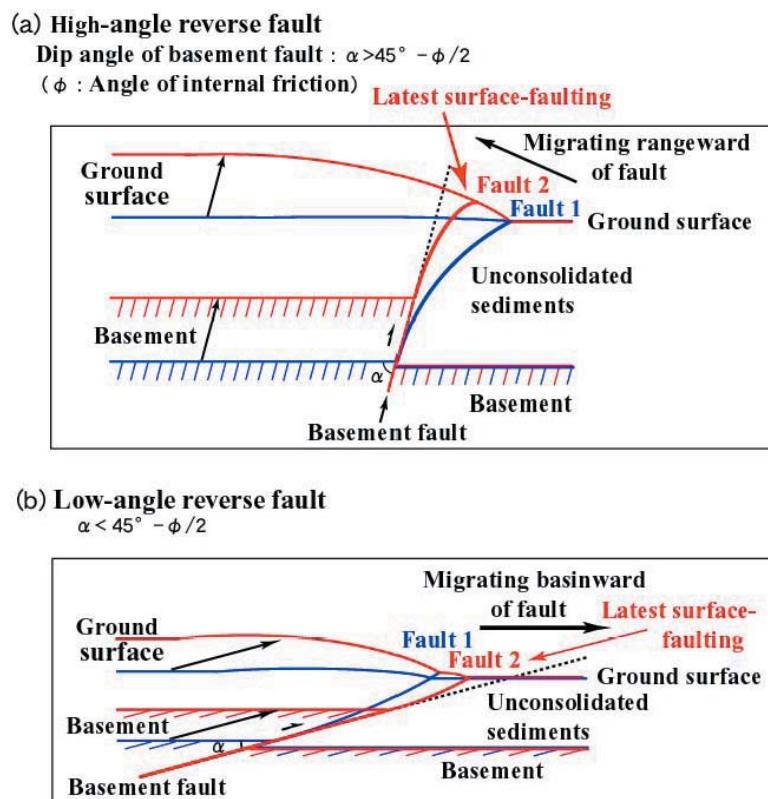


Fig.2 Migration of reverse faulting