

## Latent temporal bias in constraints of paleoseismic events and recurrence intervals on an active fault

# Shinji Toda[1]

[1] Active Fault Research Center, GSJ/AIST

We argue whether local geologic exposures and dated samples are capable enough to detect all recent paleoseismic events on an active fault. To evaluate such ability of event detection, we performed Monte Carlo simulations to examine if synthetic earthquakes on a fault can be properly detected from a population of radiocarbon samples yielded from the real trench surveys from the Shonai-Heiya-toen active fault zone, northeast Japan. In the simulations, we changed parameters for synthetic earthquakes such as assumed recurrence interval and coefficient of variation, and number of samples picked up from an imaginary trench on the fault. As the results of 1000 time trials, we find characteristic temporal bias of the dating samples does not allow observers to detect all paleoseismic events and tends to overestimate average recurrence intervals on an active fault. In the case of the Shonai-Heiya-toen active fault zone, due to the deficit of sediments in the last glacial climax (MIS 2), the detected average recurrence interval during the past 50,000 years in the trenches is twice as long as the synthetic earthquake repetitions. In contrast, detected recurrence intervals for simulated 5000-8000 yr cycles are underestimated when observers use the data in the most recent 10,000-year period.