

Drilling survey of the seaward extension of the Mikata and Nosaka fault zones off Mihama Town, Fukui Prefecture

SUGIYAMA, Yuichi^{1*} ; INOUE, Takahiko¹ ; MURAKAMI, Fumitoshi¹ ; SAKAMOTO, Izumi² ; TAKINO, Yoshiyuki² ; NAGATA, Takahiro³ ; HOSOYA, Takashi⁴ ; USAMI, Takuya⁵

¹AIST, ²Tokai University, ³Dia Consultants Co., Ltd., ⁴Chuo Kaihatsu Corporation, ⁵Sogo Geophysical Exploration Co., Ltd.

AIST and Tokai University conducted, as part of MEXT 2013 nearshore active fault survey project, high-resolution acoustic reflection surveys and shallow-sea drilling survey across the Mikata and Nosaka fault zones off Mihama Town, Fukui Prefecture. We present the major results of the drilling survey. For the N-S-trending Mikata reverse fault zone, a 4-m-deep core was extracted from the 51-m-deep sea bottom on the western (downthrown) side. For the NW-trending Nosaka strike-slip fault with a reverse component, 27m- and 12m-deep cores were obtained from the 12m-deep sea on the SW (downthrown) and NE (upthrown) sides, respectively. We compiled geologic columns at scale of 1: 10 and conducted magnetic susceptibility measurement, radiocarbon dating, volcanic ash analysis, and diatom and pollen analyses.

Regarding the Mikata fault zone, obtained radiocarbon ages are proportional to the depth, reaching 6,180 to 6,010 and 6,380 to 6,260 cal.yBP at a depth of 3.8m. The average sedimentation rate during the recent 6ky is calculated at 0.6 m/ky. Acoustic reflection surveys have revealed several continuous reflection surfaces displaced by the fault, including the probable base of the postglacial deposits. We are trying to identify faulting-event horizons, using height difference of each reflection surface across the fault. Because drilling survey was unable to determine the age of each reflection surface, we are making efforts to estimate them, extrapolating possible depth-age curves of the postglacial deposits.

The deposits extracted from the both sides of the Nosaka fault zone are divided into the following stratigraphic units based on lithofacies and radiocarbon ages: A1 (<ca.6ka), A2 (ca.6-7.3ka), A3 (ca.7.3-7.5ka), B1 and B2 (ca.7.5-8ka), C (ca.8-10ka) and D intercalating 30-ky-old AT tephra. A1 is subdivided into the upper part (<ca.4ka) and the lower part (ca.5.5-6ka). While the basal surface of B2 shows 5m height difference across the fault, that of the lower A1 represents 1.7m difference across the fault. The lower A1 also shows drastic change in thickness from 1.1 m on the downthrown side to 0.2 m on the upthrown side. These suggest that faulting occurred twice; in the periods post-C/pre-A (8-6ka) and post-lower A1/pre-upper A1(ca.5.5-4ka). Faulting history and slip per event are further examined, incorporated with analyses of acoustic reflection survey data.

Keywords: Mikata fault, Nosaka fault, active fault, acoustic reflection survey, sea drilling