

Paleoseismic events along the Takano-Shirahata segment of the Hinagu fault zone revealed by trench investigation

*Yoshiki Shirahama¹, Yukari Miyashita¹, Takashi Azuma¹, Tetsuhiro Togo¹, Masao Kametaka², Yuji Suzuki²

1. Advanced Industrial Science and Technology, Geological Survey of Japan, Research Institute of Earthquake and Volcano Geology, Active Fault Research Group, 2. Dia Consultants Co., Ltd.

Hinagu fault zone is extending from Kiyama in Kamimashiki District, Kumamoto Prefecture to the southern part of the Yatsushiro Sea. This fault zone is divided in three segments, Takano-Shirahata segment, Hinagu segment, and Yatsushiro Sea segment (Earthquake Research Promotion Headquarters, 2013). Associated with the 2016 Kumamoto earthquake sequence, approximately 6-km-long surface ruptures were produced by dextral strike-slip motion along the Takano-Shirahata segment (Shirahama et al., 2016). Even though we need to accurately estimate probability of large-scale earthquake occurrence, the paleoseismic history of the Hinagu fault zone is not well known. GSJ, therefore, conducted a trench investigation at the Hinagu fault zone to obtain more detail paleoseismic history such as the latest event or recurrence interval at two sites: Yamaide at the Takano-Shirahata segment and Minamibeta at the Hinagu segment. In this presentation, we will mainly introduce the paleoseismic history revealed by the trench investigation at Yamaide.

Soon after the 2016 Kumamoto Earthquake, our field investigation at Yamaide found small surface deformation resulting from a right-lateral strike-slip motion on the rice field where the east side was slightly upthrown. The trench, which is 14 m long, 10 m wide, and 4 m deep, was excavated across the southernmost part of the surface ruptures. Some reverse faults and deformed layers were obvious on the trench's wall surfaces. On the northern wall facing the south, two strands of reverse faults and on the southern wall four strands appeared. They steeply dipped to the east. Some layers composed of clastic sediments were possibly deposited by fluvial processes dipping towards the west and cut by those faults. The vertical displacements along some faults of older (lower) layers had accumulated more than younger (upper) layers. Some ¹⁴C dating results showed the oldest humic silt layer in the trench deposited about 15 ka. This suggests that those faults were in active during the period of deposition after 15 ka. In this presentation, we will report the seismic history of the Takano-Shirahata segment of the Hinagu fault zone revealed by the trench investigation, and discuss the relationship with paleoseismic histories of other segments.

Keywords: Hinagu fault zone, 2016 Kumamoto Earthquake, Trench survey