

High-resolution seismic reflection survey of near-surface deformation structure of the Kureha-yama fault using Land Streamer

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High-resolution shallow seismic reflection surveying by means of Land Streamer is capable to image detailed structure of a faulted zone down to 100 m in depth. The Land Streamer consists of a woven belt, a seismic cable, and geophone units. Because the geophone units are coupled to the paved surface with the metallic baseplates, the tool can be easily towed by hand, or by a vehicle. Even this non-planted coupling through the baseplate, the tool can receive comparatively clean data on the pavement.

We adopted it for the delineation of near-surface deformation structure of the Kureha-yama fault, Toyama Prefecture. A 550 m long seismic line was deployed to obtain P- and S-wave seismic profiles across the fault. CMP stacked sections profiled a low angle thrust faulting and related deformation structure at the frontal part in the near surface down to 200 m in depth. Other two 100 m long parallel seismic lines were set along a railway at a residential area where the fault was inferred to extend. S-wave CMP stacked sections delineated flexure structure unconformably overlain by recent flood deposits. The depression structure was concordant with interpreted structure of logs drilled near the lines. As a result, high-resolution shallow seismic reflection surveying using Land Streamer is helpful to provide valuable information regarding seismic zoning near an active fault for earthquake disaster prevention of infrastructures.