

High-resolution seismic reflection survey of Holocene buried channel using S-wave type Land Streamer in Soka City.

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High-resolution shallow seismic reflection surveying was conducted in Soka City, Saitama Prefecture. The objectives of the survey are to clarify the detailed structure in Holocene soft sediments and to make a 2-D model of near-surface S-wave structure. We utilized SH-wave type Land Streamer which enabled us to apply seismic reflection surveying even at a paved area as well as under high noise level condition caused by heavy traffic and industrial activities. Two seismic lines (EW1 and NS1) were deployed to obtain a seismic profile in a buried channel (NS1) and that across a buried terrace through a slope to the channel (EW1).

The seismic reflection survey successfully delineated characteristic structure in the Holocene sediments as listed below; first, a buried terrace and its foreset slope were clearly imaged in the section. Onlap pattern was identified at the terrace slope. Second, dipping toward channel axis was obviously recognized in the surficial Holocene sediments. Third, it appears that the top horizon of Pleistocene sediments descends stepwise to south, which suggests multi-stage incisions by paleo-current along the channel.

The seismic profiles were interpreted geotechnically based on borehole data and converted to a 2-D shear wave velocity structure model for the surficial part of the survey site. The 2-D velocity model was utilized for numerical simulation of the seismic responses under strong motion and also for 3-D modeling of S-wave structure of the survey site in combination with passive surface wave survey results.