

Multi-offset reflection records from point scatterers and velocity analysis

*Kyosuke Onishi¹, Hiroshi Kisanuki¹, Takanori Ogahara¹, Tomio INAZAKI¹

1. Public Works Research Institute

Ground-penetrating radar records include a lot of reflection events from point scatterers. Soil and ground in near surface includes many stones which are smaller than a typical wave length of propagated electro-magnetic waves of ground-penetrating radar. This relationship is far difference from standard reflection seismic records which include mainly reflection events from continuous layer boundaries. Records of ground-penetrating radar show a lot of diffraction patterns from small scatterers which are frequently main survey targets of the ground-penetrating radar surveys. When applying migration processing for the ground-penetrating radar records, the events from point scatterers sometimes change difficult to be detected in background waves. Therefore, migration processing is frequently skipped in the processing of ground-penetrating radar. The other characteristic issue due to point scatterers in ground-penetrating radar survey is much noise in a semblance panel for velocity analysis. Point scatterers are not normally located just below the survey line. A point scatterer located with the same length of propagation path but not located just below the survey line must be located in a shallower zone from a point scatterer located just below the survey line. Different depth zones frequently have different dielectric constant and the reflection event from a point scatterer not located just below the survey line, which is frequently located in a different velocity zone, makes a strong error event in the semblance panel. We want to discuss this issue and try to avoid it using 3D multi-offset records.

Keywords: GPR, velocity analysis, scatterer