Estimation of basin structure of Ashiraga valley using S to P conversion waves

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It is important to know the sub-surface structures for evaluation of strong ground motion. Since significant later arrivals are observed in sedimentary basin, the basin structures are discussed using surface waves that form the later arrival parts. Uetake and Kudo (2001) discussed about the sub-surface structures of Ashigara valley using dispersion characteristics of Love waves that passed through Ashigara valley area. Their result shows the outline of subsurface structure but don't have so high resolution to evaluate strong motion characteristics because of array size and period range using dispersion analysis. More detailed information about subsurface structures are needed for evaluation of strong ground motion with period around 1 s. In this study, we try to take out the information of subsurface structures from the S to P conversion waves that converted at boundary of subsurface layers.

Significant SP conversion waves were shown in UD component of the records before S arrival during Kanagawa-ken seibu event of October 25, 1996. The focal depth of this event was 25km and epicenter distance was about 25km for the stations located in southern part of Ashigara valley. Waveforms have small initial P-phase and large S-phase. These characteristics are consistent with source mechanism. The input wave to the basement of the valley seems to be direct body waves. The time lag between S-wave arrival and first phase of SP-wave part in the south part of the valley about 1.0 to 1.5 s and it became shorter in west part of the valley. Time lag S - SP was not simply decreased to the north part of the valley along the long axis of the valley. These characteristics suggest that basin structure is complex.

The records of stations in the South - East part of Ashigara valley have clear SP conversion waves and almost same waveforms. These stations were used as small array to evaluate Love wave's dispersion and to estimate subsurface model in Uetake and Kudo (2001). We compare the SP conversion waves calculated from subsurface structure model using Haskell's Matrix method. The SP conversion waveforms show shorter S-SP time. The difference of simulated result and observed ones are decreased after the model tuning.

We confirmed that the SP conversion waves were not affected basin edge using 2-dimensional pseudo spectral method. We compared the waveforms from the epicenter result from flat-layered model and basin structure model. The later arrivals of basin model show large amplitude and long duration in basin area but the SP converted wave parts almost the same as ones from flat-layered model. It means the SP conversion waves are locally generated and it has an advantage for estimation of sedimentary structures.