The estimation of distribution of alluvial deposits in Japan to sophisticate the seismic hazard map

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The thickness of subsurface soft sediments has correlation with the distribution of the strength of long-period ground motions generated by earthquakes and with that of collapsed houses for earthquakes. It is important to estimate the thickness changes of alluvial deposits for the seismic hazard prevention. Because many large cities are located on alluvial lowlands filled with thick soft sediments in Japan. However, 3-D distribution of the alluvial deposits, that is coastal prism, has not been cleared yet except some areas. The thickness changes of alluvial deposits were estimated based on the two kinds of river longitudinal profiles; one is the present river profile (PRP) and the other is Last Glacial River Profile (LGRP) constructed by the distribution of basal gravel layers.

In Japan, from Hokkaido to Kyushu, 28 rivers were analyzed. We measured PRP using topographic maps and collected data of the basal gravel bed from previous studies to calculate the relative height between LGRP and PRP from the river mouth to the crossover point of the two profiles above.

The thickness of alluvial deposits at around the present river mouth, ranges from 15m (Monobe.R) to 155m (Shinano.R) and is 57.4m in average. The length of alluvial deposits ranges from 4.5km (Monobe.R) to 77.5km (Shinano.R) and is 26.5km in average. The thickness of alluvial deposits along the river decreases linearly toward upstream except three rivers of Natori, Shinano, and Kiso rivers. This indicates that the thickness changes of alluvial deposits except the above three can be expressed as a linear-function, although the decreasing ratio is various among the 25 rivers depending on the steepness of the LGRP. In contrast, three river valleys show irregular pattern of the thickness of alluvial deposits probably due to Holocene rapid subsidence.