

Possibility of tsunami inundation in Tokyo and Nakagawa Lowlands on the basis of surface deposits and tsunami simulation

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Tsunami prediction of Tokyo and Nakagawa lowlands is so important that some trials in Tokyo has been done (Hatori, 2006; Tokyo Metropolitan Government, 2012. etc). In both lowlands, however, there are few tsunami data, both geological evidence and historical documents.

In Soka City in Nakagawa lowland, located about 25km north of the present coasts, an event deposits formed by strong energy such as tsunami after 1400 years ago was reported (Kurosawa and Kosugi, 1996).

We carried out a tsunami inundation simulation in Tokyo Bay, and reexamine the tsunami deposits in Tokyo and Nakagawa lowlands, and then consider the possibility of tsunami inundation in the past and the present by comparing the simulation results and geological evidence.

We conducted the tsunami inundation simulation in Uraga Strait and Tokyo Bay using 50 m DEM basically, giving a rise of 6m in sea level by the entrance of Uraga Strait. As a result, the maximum water level in the northern Tokyo Bay is 3-5 m, in the southern Tokyo Bay and the Uraga Strait is 4-9 m.

At present, Tokyo Bay is mostly surrounded by higher reclaimed land and dikes than the maximum water level by the simulation in the Tokyo coastal zone. Behind those, however, the lowlands are occupied with very low altitude area. Thus, elevated water would run up through rivers and small waterways.

The water level resulted from the simulation is almost consistent with tsunami heights of the historical documents in the southern Tokyo Bay and Uraga Strait. But there is no enough evidence in the northern Tokyo bay.

There is quite few geological evidence in Tokyo and Nakagawa lowlands, so far, except the site in Soka. However, the paleogeographic condition in 1400 years ago to around the Genroku is greatly different from the present. For instance, the shoreline was located 10-15 km north of the present one.

Therefore, we have to consider different condition for the next tsunami simulation, using reconstructed topography and shoreline of 1400 years ago to the Genroku. This enables us to compare the simulation and geological evidence, and to examine the tsunami inundation possibility in Tokyo and Nakagawa Lowlands.

On the other hand, it is necessary to increase geological evidence of tsunami in this area. About the Soka case, i.e., sedimentary and dating data of the event sand deposit are obtainable, and the distribution of the sand layer is examined by boring data in Soka.

Finally, in Tokyo and Nakagawa lowlands, geological evidence and historical documents of tsunami are quite scarce. Our future purpose is to integrate geological approach and the tsunami simulation, and to make progress in examining possibility of tsunami inundation.

Keywords: Tsunami deposits, Tsunami simulation, Tokyo Lowland, Nakagawa Lowland