

Land subsidence in Sendai Plain due to the March 11 quake

Land subsidence has been widely observed in the low-lying areas and along the coast of the Sendai Plain due to the crustal movement triggered by the Tohoku Earthquake off the Pacific Coast.

In addition, the entire levee along the Sendai Plain coast has been either totally or partially destroyed by the devastating tsunami waves. The sand dunes along the coast have also been lost due to erosion and other related events caused by the tsunami.

For those reasons, the safety to storm surges and other similar hazards has lowered dramatically in the Sendai Plain. To better understand the situation, land subsidence over the entire Sendai Plain coast was analyzed based on data from aerial laser survey and other sources^{*1}, and then the relationship between the land and sea levels was clarified. Before the earthquake, the total area below the mean sea level was 3 km² out of the 83 km² area below the highest high sea level. The analysis found that these figures have increased to 16 km² and 111 km², respectively.

	Before quake	After quake	Increase rate
Area ^{*2} below mean sea level ^{*3} (T.P.±0m)	3 km ²	16 km ²	5.3 times
Area below high spring tide ^{*4} (T.P.+0.7m)	32 km ²	56 km ²	1.8 times
Area below highest high sea level ^{*5} (T.P.+1.6m)	83 km ²	111 km ²	1.3 times

*1 Some data are from the on-site investigation after correction.

*2 Areas are rounded to the whole number.

*3 Mean sea level in Tokyo Bay (T.P.±0m).

*4 High water level: the average of monthly highest water levels observed within five days from a new or full moon, which is T.P.+0.7m as shown in the table above.

*5 T.P.+1.58m (calculated based on the 1980-2010 data collected at the Sendai New Port Tide Station) was rounded and used as T.P.+1.6m.