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Some cases of liquefaction in the central Kanto plain caused by the 2011 Off Pacific Coast of Tohoku earthquake

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1. Preface

The Off Pacific Coast of Tohoku earthquake in 2011 induced liquefaction in lowland areas extending over the eastern side of northeast Honshu, including not only coastal reclaimed lands but also inland low plains. We report a few cases of them appeared along the mid-Tone river in the central part of the Kanto Plain. We investigated the liquefaction in Watarase flood prevention reservoir and the Minamikurihashi district on April 4, 2011, we report it. Watarase flood prevention reservoir and the Minamikurihashi district are located in the central part of Kanto basin and hit a middle part of Tone river.

2. Watarase flood prevention reservoir

The Watarase flood prevention reservoir is composed of Yanaka lake and the first adjustment pond, the second adjustment pond, the third adjustment pond. Liquefactions occurred in an exercise park located north end of first adjustment pond. At the time of the investigation, there were eruptive sand around some cracks. The grain size is medium or fine. As for the width of the crack, 3 to 5 cm, depths are 20 to 30 cm and length is 20 to 30 m or more. A large quantity of eruptive sand flowed into the gutter of the ground side. In addition, there were erupted sand at the joint of pavement of the road in this park. At the part of covered with lawn, we recognized erupted sand. The tennis court where certain pavement was given an earth surface was within the park, crack and erupted sand were not recognized.

3. Minamikurihashi district

The Minamikurihashi district is a residential area developed around Tobu Railway Nikko Line Minami-Kurihashi Station. Because the opening of business of the station is August, 1986, it seems that it was prepared land near this year. Judging from a figure of aerial photo (1947) of the United States Armed Forces photography and topography classification of Hirai (1983), the topography is a former river channel and wetland. This district is estimated that which is composed of old valley at the period of the lowest sea level and that was flood plain and wetland during the Holocene. In the Kanto earthquake of 1923, many cracks were formed in the right bank of Nakagawa river near this district (Kadokura, 1925). There are records of erupted sand in the West Saitama earthquake of 1931 in Sakurada village (Kumagaya Meteorological Observatory 1932).

Liquefaction occurred around exercise ground in southwestern residential area and the land developed for housing which were not sold in lots. The subsidence of the wooden house and damage of water supply and sewage equipments occurred. Restorations are not completed at the time of the investigation.

4. Conclusion

The central part of the Kanto Plain where many rivers are concentrated contains extensive areas which tend to be affected by liquefaction. Although similar events as previously occurred in big earthquakes take place in the present event again, it is quite different that a part of this area was urbanized in recent several tens of years. The facts seem to be remarked in land-use planning in future.

Keywords: 2011 Off Pacific Coast of Tohoku earthquake, Kanto plain, liquefaction