

AHW016-P02

Room: Convention Hall

Time: May 26 17:15-18:45

Water chemistry of shallow groundwater in the urbanized Shakuji river catchment, downtown Tokyo, Japan, with special re

Masaya Yasuhara^{1*}, Akihiko Inamura¹, Takeshi Hayashi²

¹Geological Survey of Japan, AIST, ²Akita Univ.

Water chemistry of shallow groundwater in the Shakujiigawa catchment in the downtown of Tokyo is discussed with special reference to its chloride and nitrate concentrations. The Shakujiigawa catchment is divided into the highly urbanized lower reaches (Itabashi and Kita Wards) and upper reaches which are urbanized to a lesser extent (Nerima Ward and Nishi-Tokyo City). In July 1996, shallow groundwater samples were collected along the riverbank from 56 points, where the groundwater table is located within ca. 8m below the ground surface. Out of 56 samples, 27 are from the lower reaches and 29 from the upper reaches. Groundwater is assumed to occur in the Kanto loam layer and/or underlying stream terrace gravels.

The average chloride concentration of shallow groundwater in the lower reaches (18.2 mg/l) was found to be nearly equal to that of the upper reaches (17.7 mg/l). In contrast, the nitrate concentration in the lower reaches averaged 17.3 mg/l, which was much lower than that of 26.0 mg/l in the upper reaches. It was also observed that the bicarbonate concentration in the lower reaches groundwater is in the range between 73-447 mg/l, whereas that in the upper reaches shows lower values and ranges between 22 and 167 mg/l.

These analyses are indicative of progress of denitrification, which is most likely to take place in an anaerobic groundwater environment of the highly urbanized lower reaches of the catchment. Reduced groundwater recharge by precipitation due to an extensive impermeable surface can be responsible for the stagnant groundwater and creation of an anaerobic groundwater condition in the lower reaches. Although nitrate is lost from groundwater by denitrification, bicarbonate, on the contrary, is added to groundwater. Leaking sewers may contribute much carbon substrate to maximize biological activity in the saturated zone of the lower reaches, where sewer pipes were installed long time ago and estimated to be considerably damaged compared with the recently-laid sewerage system in the upper reaches.

Keywords: shallow groundwater, urbanized catchment, water chemistry, nitrate concentration, denitrification, Tokyo