

## Effects of climate change and groundwater flow on geothermal profiles

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The effects of surface warming due to global warming and urbanization were observed in geothermal profiles of 30 boreholes in Tokyo metropolitan area. The effect of surface warming reaches deeper than 100m below the surface in the groundwater recharge area, but shallower than 30 m in the discharge area. The groundwater recharge rates are estimated from heat conduction-convection theory under the condition of the surface warming to be 200-600 mm/year in the Musashino and Tachikawa terraces and to be negative (upward flow) in the Shitamachi lowland. The interface between fresh water and seawater is also recognized in the geothermal profiles. Groundwater discharge rate into the ocean was estimated to be 70-90 mm/year in the coast of Tokyo Bay.