

Groundwater environment in the Tokyo Lowland from subsurface temperature distribution

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To evaluate groundwater environment in the Tokyo Lowland and its surroundings, we have obtained 3-dimensional subsurface temperature distribution measuring temperature-depth profiles. Regional variation exists in subsurface temperature distribution. High temperature area is distributed in the south from the central part of the lowland, and low temperature area in the east from the inland area. Distribution of the high temperature area agrees well with distribution of the area where the upper surface of basement is shallow, and where severe ground subsidence is observed. This suggests that the existence of groundwater flow is affected not only by geological structure but by pumping. Moreover, the high temperature area corresponds with the estimated location of particular hydrogeological structure which dominates groundwater flow as pointed out in the past. Subsurface temperatures differ greatly between north and south sides of the high temperature area, and support the existence of estimated hydrogeological structure. On the other hand, falling subsurface temperatures were shown in the inland area from 1956 to 2001. Groundwater recharge from the surface seems to be the reason of this falling temperature based on the result of numerical analysis. The change of groundwater flow regime in the Tokyo Lowland by pumping became clear from subsurface temperature measurements.